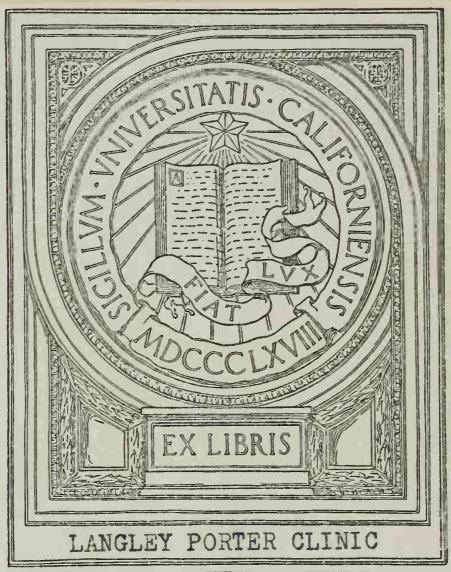

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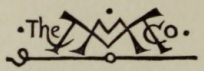

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NEUROLOGICAL AND MENTAL DIAGNOSIS

A MANUAL OF METHODS

BY

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PREFACE

THIS volume is designed to aid the student and general practitioner to make thorough and systematic examinations in nervous and mental diseases. A definite method of procedure is laid down in both lines of examination in order that proper analysis may be easily and readily made in routine case study either in hospital or private practice. The necessity and desirability of forming correct habits in case examination are in line with the advanced teachings of modern medicine. The chapter on neurological methods is by Dr. Clark and that on mental examination is by Dr. Diefendorf.

THE AUTHORS.

FEBRUARY 1, 1908.

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NEUROLOGICAL AND MENTAL DIAGNOSIS

METHODS OF EXAMINATION IN NEUROLOGICAL DIAGNOSIS

Part I

CHAPTER I

In the clinical study of nervous diseases it is essential for accuracy and rapidity in diagnosis to employ a systematic method of examining patients.

Inasmuch as the forms of nervous diseases vary so much in character, no one method of examination can always be adhered to rigidly, but this does not destroy the feasibility of using a more or less definite system of study of the cases. In the following pages a general method of procedure is indicated which may be modified or curtailed to suit individual diseases. When a patient is first seen by the physician it is often eminently desirable to make a preliminary rapid survey of the case. Such examination sometimes enables the physician to make a provisional diagnosis for immediate treatment and gain intelligent guidance for sub-

sequent more elaborate and special examination. A preliminary examination should cover the essential points of an extended scheme; a detailed record of the latter is shown in a composite case which is reproduced here to illustrate the points in the examination. In recording the clinical findings of the examination intelligible abbreviations should be used wherever possible, but the use of symbols is to be discouraged for obvious reasons.

The diagnosis must rest largely, at least in most cases, upon the careful objective or direct examination of the patient for the detection of the signs and symptoms of disease. The history of the patient and of the development of his disease as gathered from the patient or his friends is of course of great importance, but the diagnostic indications that are obtained in this way are to be used in subordination to the objective signs of disease about to be detailed. Where the indications derived from the two sources conflict, preference is always to be given to conclusions that are obtained from an examination of the patient. In short, an effort should constantly be made to make the diagnosis of organic nervous diseases as purely objective as possible, the history being used chiefly in sub-

ordination to the physical signs for the confirmation and correction of the diagnosis based upon them.

Complaints. — A brief statement of what the patient complains and the duration of the disorder should begin the history.

Family History. — The cause of death of the immediate relatives should be learned as far as possible. Particular inquiry is to be made regarding alcohol, syphilis, tuberculosis, insanity, epilepsy, or other nervous diseases in the family.

Personal History. — Noteworthy facts of intrauterine life, birth (its accidents and incidents), diseases of infancy, habits, etc., are to be recorded in chronological order. Special inquiry is to be made concerning evidences of rickets, as this often seriously influences the vulnerability of an individual to nervous stresses in later life, particularly epilepsy and allied conditions. A very important question is that of infectious diseases. Both the acute and the chronic infectious diseases may lay the basis for nerve troubles that follow directly or after an interval of weeks, months, or years. Typhoid, smallpox, diphtheria, scarlet fever, measles, and influenza are specially to be noted. Tuberculosis and nerve diseases are often related. The greatest care must be given to the question

of past venereal diseases, particularly syphilis. The misuse of alcohol, morphine, cocaine, chloral, and other poisons is to be noted. Inquiry should also be made concerning long-continued occupation with lead, arsenic, mercury, copper, brass, etc. Anomalies of sexual life, such as masturbation and perverse instincts, are to be asked after. Injuries, overexertion, and mental excitement play very important rôles in the etiology. The age of puberty, and in women, periods, — frequency, pain, etc. Number of children and miscarriages, etc., should be carefully inquired into.

Present Illness. — A chronologically arranged account of both the physical and mental symptoms should be followed by a summary of the present condition. The inquiry should be specific concerning alienation, exaltation, perversion, depression, defect, stupor, delirium, coma, memory, vertigo, convulsions, headache, epileptic or apoplectic attacks, vomiting, etc.

Physical Examination. — For the present purpose the special examination can be made under the following headings: —

A. Cranial Nerves

I. *Olfactory.* — Injury to this nerve shows itself by loss of smell. When the sense of smell has

been lost, the person often complains simply of loss of taste, as this is the more serious deprivation. Since disease of the mucous membrane of the upper part of the nose may show itself in the same way, this must be excluded in case loss of smell is found. To test the sense of smell a bottle stopper or a piece of cotton touched to some odorous substance (asafœtida, musk, peppermint, cloves) is held for a short time to one nostril while the other is closed; the patient is to name the substance, or at least to say that the smell is familiar. These substances are chosen because they act on the sense of smell only; moreover, they are easily identified and named. Many persons, even though such common substances are employed, can only recognize an odor, but cannot name it; this is, however, practically sufficient, as all that is desired is to know that the nerve impulses are transmitted.

Only a small amount of the substance should be used in the test. It is used on the bottle stopper or on a piece of cotton. This is applied to the nostril for only a brief time, because excessive stimulation may deaden or paralyze the weakened or imperfect sense organs before the entire examination is finished. The test is applied to the nostrils alternately.

II. *Optic.* — The only data required are those concerning acuteness of vision, the limits of the field of vision, and the state of the optic disk. The acuteness of vision is tested by the familiar test types of Snellen. The types are placed at a distance of 6 meters (20 feet), and the patient is required to read the letters on the chart; the number under the line of smallest letters he can see is placed under the number 20. With normal vision he should read to the line having the number 20; his vision would then be 20/20. If his vision is less than this, he moves toward the chart until he can see the largest letter; if this is at 8 feet, his vision is 8/20. If the top letter cannot be read, the distance at which the fingers can be correctly counted is recorded, thus V fingers at one foot, or at seven inches. If this cannot be done, the hand is moved before the eyes and *perception of hand movement* is recorded. Where no vision of form is found, the *perception of light* (P. L.) is tested by shading and exposing the eye or flashing a light into it in a dark room.

Each eye is tested separately. For testing near vision, Jaeger's test type is often used.

To find the limits of the visual field the hand or candle test may be employed. The patient is placed with his back to the light about two feet

in front of the examiner. One eye is covered; with the other eye the patient must look at the examiner's eye constantly. The examiner's hand is moved in various directions from outside the field of vision inward until the patient sees it. Both examiner and patient should see the hand simultaneously if the field has the normal extent. A lighted candle may be similarly used. When defective, the field may have temporal, nasal, upper or lower contraction. Scotomata are detected by passing the hand through all parts of the field. The blind spot is an anatomical affair.

The examination of the fundus is made with the ophthalmoscope by the direct and the indirect method. These examinations should be made whenever organic lesion of the central nervous system (especially in cerebral cases) is suspected.

III, IV, VI. *Motor Oculi, Patheticus, and Abducens.* — These are examined together, as they control all the movements of the eye. The patient is required to follow the finger from right to left, left to right, up and down, and approaching in the median plane to the nose. The head must be held steady (candle test with red glass in front of one eye).

The first point to be tested is (*a*) limitation of movement. This occurs always in the direction in which the paralyzed muscles act; limitation of movement of the right eye toward the right side indicates paralysis of the right external rectus, which is controlled by the sixth nerve, and so on.

The next test concerns (*b*) correspondence of the visual axes. Normally the visual axes remain parallel for fixation at infinity in all associated movements of the eyes. Any non-correspondence shows itself as internal or external strabismus in one or both eyes.

The third test concerns (*c*) secondary deviation of the sound eye. This is the most delicate test of a slight paralysis in any single eye muscle. It never appears in any form of ordinary squint. To carry out the test the sound eye is prevented from seeing by screening the object by the hand or a piece of cardboard; the patient fixes the object with the affected eye. The object is moved in the direction of one of the muscles. If any paralysis is present, the sound eye will move farther than the affected one. The increase over the primary deviation of the axes is called the "secondary deviation." The result is tested by covering the paralyzed eye and requiring the

patient to fix the object with the sound eye, which will then move to its original position.

In ordinary squint, or "strabismus," the deviation is present in all movements; it is the same no matter which eye is used for fixation. In paralysis of one of the eye muscles — "paralytic strabismus" — the normal eye produces the primary deviation, the affected eye the secondary one. The primary deviation indicates defective movement, whereas the secondary shows itself as an excess of movement. They are similar in direction, but opposite in character.

The fourth test concerns (*d*) erroneous projection of the retinal pictures. The positions of objects seen depend upon the feeling of muscular effort required to turn the eye to look directly at them. When an eye muscle is weakened, a greater effort must be made to force it to act; the distance which the eye has to turn thus involves more work. Consequently the distance between objects appears greater than otherwise. The paralyzed eye therefore does not correctly locate objects. The error is a mental one of judgment. The test is made by closing the patient's sound eye and requiring him to grasp quickly with thumb and finger an object in front. He misses toward the side of the paralyzed muscle. The degree of the

errors increases with the amount of the paralysis and with the extent of the eye-movement required. The amount of the error is to be recorded.

In carrying out the fifth test — for (*e*) double vision — a lighted candle is moved around in the field of vision, preferably over a diagram, divided into nine squares by two horizontal and two vertical lines, placed ten feet away. A red glass is placed over one eye so that the patient can tell which of the two images he sees belongs to that eye. The points recorded for each of the nine spaces are (1) single or double vision, (2) whether the image on the right side belongs to the right eye (uncrossed images) or to the left eye (crossed images), (3) the relative distance between the images, (4) any difference in the level of the images, (5) whether they are erect or tipped. All these symptoms are in the direction of the normal action of the paralyzed muscle. In a paralysis of several muscles, solution of the results of the test requires great patience. Before drawing diagnostic conclusions from the presence of diplopia we must show that it is not monocular (due to dislocation of the lens), and that it ceases in using only one eye. Crossed diplopia means that the prolonged ocular axes are not crossed.

As a sixth fact (*f*) the characteristic position of the head is to be noted. The patient turns the head toward the side of the paralyzed muscle and in the direction in which the muscle would move the eye if not paralyzed. The head muscles are thus used to diminish or correct the double vision.

The character and degree of nystagmus are noted, if present, during these tests.

V. *Trifacial.* — Disease of the nerve first shows itself in injury to the sense of touch. The presence of the sense of contact and the ability to localize objects on the skin are the only points tested. Two pieces of cotton-wool are applied simultaneously to corresponding parts of both sides of the patient's face in the three areas of distribution (forehead, cheek-bone, and chin). The patient's eyes are, of course, closed. He is required to tell how many times he is touched, whether the two were on one or both sides of the face, and to name the portion touched. In the case of correct answers, he is to put his finger on the spots touched. When this test shows diminished or lost sensibility, the sensitiveness of the conjunctiva and the tongue is tested by a camel's-hair brush. The irritability of the mucous membrane of the nose is tested by snuff or ammonia. A complete sensory examination (for details see "Sensory Ex-

amination") is to be made in case any alteration of touch is found.

It is well to examine the sense of taste at this point, because any abnormality is considered as a disease of the fifth nerve. Sugar, citric acid, salt, and quinine are representative substances that produce the four tastes — sweet, sour, salty, and bitter — without arousing the sense of flavor (that is of smell). Bitter and sweet are tested at the back of the tongue; sour and salt at the tip and edges. The tests are not to be confined to minute areas, as there are spots that perceive one taste and not another. Taste is more acute in the young than in the old; individuals differ greatly. The test substances are employed in the form of solids, as their action can be more readily limited. The powder is employed with light friction and a short time allowed for it to dissolve. The tongue is kept protruded. The patient gives a signal as soon as he perceives a taste.

A constant electric current furnishes the most accurate test for the nerve of taste, because it acts directly on the nerve endings. Two insulated wires with their points a few millimeters apart are connected to one or two galvanic cells; such a current (of two or three volts) is sufficient to arouse the sense of taste in normal conditions;

a stronger current would cause pain and obscure the result. This method should be employed specially to test the three regions: front and back of the tongue and the palate, when fracture of the base of the skull involving the chorda tympani is suspected.

By placing the fingers on the masseter and temporal muscles of both sides and requesting the patient to bite forcibly, it is possible to recognize feebleness or absence of contraction resulting from affection of the motor branch of the fifth nerve. When the injury is slight, the affected muscle may contract a little slower and later.

Inability to move the jaw toward the unaffected side, and deviation toward the paralyzed side when the jaw is depressed, indicate paralysis of the external pterygoids. Inability to thrust the lower jaw forward indicates paralysis of the internal pterygoids. When the loss of power is only slight, it may be disclosed by opposing any of these movements. The downward movement of the jaw may be somewhat limited in cases of atrophy and secondary shortening of the paralyzed muscles of mastication.

Any trophy or spasmodic disorders should be noted. Painful points and areas of pain-radiation are found in neuralgic states of either func-

tional or organic basis. When there is loss of masticatory power, unilateral furring and accumulation of food in the cheek may occur on the weakened or anæsthetic side.

VII. *Facial.* — Since this is the motor nerve of the face and is involved in all voluntary acts and emotional expressions, the patient is required to perform such actions as elevating the eyebrows, frowning, closing the eyes firmly, showing the teeth, whistling, puffing the cheeks, and smiling. Voluntary and emotional acts may show differences. Unilateral loss of muscular tone shows itself in comparison of the two sides during rest. In cases of facial paralysis there may be secondary overaction after partial voluntary power returns; this defect may be seen during rest; it is intensified by slight movements and becomes marked during more forcible ones. When the patient closes the eye in strong contraction, the zygomatici on the paralyzed side will overact. This associated overaction may also be excited by reflex action through the fifth nerve (Chvostek's reflex). Any spasm present should be studied in regard to character and degree, during rest, voluntary and emotional movements. The difference in the voluntary movements of the lower part of the face, as in hemiplegics, for example, is

tested by having the patient raise the upper lip and move the mouth from side to side, when the unilateral defect will be obvious. Defect in emotional movements is seen in a smile, while the presence of an associated movement in the defective side is obtained by causing the patient to grasp strongly with the sound hand. One may detect whether the wide open eye in the early stage of hemiplegia is peripheral or central palsy by noting, under test, whether the emotional as well as voluntary movement of hemiplegic defect is lost.

VIII. *Acoustic.* — In order to exclude the frequent troubles due to disease of the ear, an ear examination has to be made. All impacted wax should be removed from the external meatus. To test the hearing the patient, with closed eyes, is required to say when he first hears the ticking of a watch that is gradually brought nearer his ear, or first loses the sound as the watch is moved away. A tuning fork may also be used. If there is no hearing in the ordinary way, the watch may be heard on touching it to the ear. If there is no hearing through the external ear, the watch or fork may be placed over the zygoma, mastoid process, or at the base of the nose. Slight defect in the meatus or middle ear is indicated when the

sound is heard longer by bone conduction than by air transmission; this is tested as follows: when the sound is no longer heard from the fork held close to and opposite the ear, it is at once placed against the mastoid process; normally, the sound will be still heard, although the vibrations of the fork are steadily decreasing.

When the external meatus is closed during the test by bone conduction, the sound from the fork is intensified normally; when this does not occur, lowered conductivity of the labyrinth is indicated. The patient often fails in this test through inability to observe. Galton's whistle may be used to test nerve deafness, as its sound is shrill and short. Deafness to all its sounds is pathological. The watch may also be used. The test is carried out as follows: the antitragus is pressed over the external meatus. The watch is held near the mastoid or zygoma, but not against it. After a moment it is pressed firmly against a bone. If the watch is heard better in contact than when not in contact, the labyrinth is intact. If it is not heard better, the experiment is repeated with the tuning fork. If it is heard more faintly, this may be due to anchylosis of the stapes. No disease of the middle ear will entirely abolish bone conduction. Failure to hear the watch by bone con-

duction often occurs after fifty years of age, yet there may be no other evidence of impaired nerve function; labyrinthine changes due to age are the cause. Bone deafness is normally rare in the first half of life. Bilateral deafness to Galton's whistle by air-transmission even in advanced life is pathological. In bone conduction the vibrations pass directly through the bone to the labyrinth; the test is therefore one that excludes the conducting medium, the meatus and the middle ear, and serves to indicate the functional state of the internal ear. The perversions and elaborations of simple sounds into definite words are usually symptoms of insanity or epilepsy.

Electrical tests of hearing produce vertigo and should not be employed. Their results are variable; they do not always aid in differentiating diseases of middle ear and nerve.

There are no tests that can be applied to labyrinth and nerve separately; the associated symptoms can be used for differentiation.

If the low notes of the Galton whistle are heard with undue loudness (hyperacusis), the stapedius muscle may be assumed to be paralyzed by disease.

If pulsating sounds are heard, their frequency should be noted. When they are synchronous with the pulse and can be modified or suppressed

by compression of the carotids, they are vascular.

IX. *Glosso-pharyngeal.* — The patient is made to swallow liquids. Regurgitation through the nose shows imperfect action of the upper muscles of the pharynx, and consequently paralysis or weakening of this nerve. Loss of the pharyngeal reflex to tickling indicates loss of sensibility of the superior pharynx. Unilateral impairment of this nerve is of little importance; there are no tests for detecting it.

X. *Vagus and Accessory.* — For practical purposes the tests are confined to the muscles of the pharynx, larynx, thorax, heart, and gastro-intestinal tract.

Inability to swallow indicates paralysis of the pharyngeal muscles. Slight disability indicates a unilateral affection of the nerves or some physical obstruction.

Paralysis of the larynx shows itself in changes or even loss of the voice. Coughing may arise from hindrance to inspiration or defective closure of the glottis. Laryngoscopic examination may reveal defective movements. Absence of vocal sounds with stridor or deep inspiration indicates complete paralysis.

When the ordinary explosive cough is changed

to a sudden rush of air through the glottis, complete bilateral paralysis is indicated. When the voice is low-pitched and hoarse, one cord is usually unaffected. With slight bilateral paralysis the cords can be used in phonation and cough, while deep inspiration produces stridor; there is no expiratory stridor, although expiration is shorter than inspiration. Tracheal stenosis does not produce so much movement of the larynx as does laryngeal paralysis. The presence of these symptoms makes a positive diagnosis of laryngeal paralysis possible. They may be slight or absent in unilateral affection of the cords; laryngoscopic examination is then necessary.

Hysterical adduction palsy is always bilateral. Speech is not affected; expiration is noiseless; inspiratory stridor may occur. A differential diagnosis from spasm of the glottis is thus rendered possible. Hysterical aphonia shows itself as paralysis of the adductors; the patient can cough but cannot speak; he can usually sing but he cannot whisper. Organic palsy shows itself in a less explosive form of cough; serious bilateral palsy is suggested in entire loss of cough and voice; loss of phonation without loss of speech indicates adduction palsy of minor import. Paralysis of one cord is indicated by loss of cough without

loss of voice. The routine of examination in a case of suspected laryngeal paralysis may well proceed according to the following scheme :—

Symptoms	Lesion
No voice; no cough; stridor only on deep inspiration	= Total bilateral palsy.
Voice low-pitched and hoarse; no cough; stridor absent or slight on deep breathing	= Total unilateral palsy.
Voice little changed; cough normal, inspiration difficult and long with loud stridor	= Total abductor palsy.
Symptoms inconclusive; little affection of voice or cough	= Unilateral abductor palsy.
No voice; perfect cough; no stridor or dyspnœa	= Abductor palsy.

The examination for pulmonary, cardiac, and gastric symptoms of lesions of the tenth nerve should be preceded by search for diseases of the organs themselves. It is only when such organic lesions are absent that the symptoms can be used for conclusions concerning the nerve itself. Disease of the nerve shows itself more or less positively

in retarded respiration, accelerated or retarded action of the heart, and vomiting. The way in which the symptoms are distributed and the disturbances associated with them will point out which portion of the vagus is diseased; the roots and branches are most frequently affected.

XI. *Spinal Accessory* (*Spinal Portion*). — Lesions of this nerve show themselves most markedly in paralysis of the sterno-mastoid, the trapezius, and the elevation of the palate. When the sterno-mastoid is affected it loses its regular prominence in the contour of the neck when the head is moved from side to side. The degree of weakening can be estimated by opposing this side movement. If only one nerve is affected (unilateral paralysis), the defect in rotation is to the opposite side. In a condition of rest there is no deviation of the head in cases of unilateral paralysis unless the opposite muscle produces it by secondary contraction.

To examine the trapezius, the examiner tells the patient to straighten the shoulders while he strives to hinder him from doing so. Complete paralysis and wasting show themselves at once to the eye. With unilateral paralysis the curves at the side of the neck will differ, producing an effect of asymmetry when the examiner stands directly in front or behind. The asymmetry appears most

markedly during deep respiration. When both sterno-mastoid and both trapezii are affected, the patient cannot maintain the head in upright position. If only both sterno-mastoids are involved, the head tends to fall back; if both trapezii, then it readily falls on the chest. Unilateral paralysis of both these muscles lets the head fall to one side or the other. Unilateral paralysis of the elevators of the velum is seen most clearly when the patient sings a long "ah" while the examiner looks into his mouth.

XII. *Hypoglossal.* — The tongue should be examined both while at rest and during protrusion. Unilateral paralysis shows itself by increased height on the affected side in the position of rest; this is due to the posterior fibres of the hypoglossus. When the tongue is pressed into the cheek it can be overcome by the finger more easily on the paralyzed side. On protrusion the action of the unopposed genio-glossus deflects the tongue toward the paralyzed side. An imaginary line is drawn vertically between the two central incisors (the nose is often deflected from the median line); the amount of deflection of the tongue is estimated from this line.

In complete bilateral paralysis the tongue lies motionless and cannot be protruded.

It may happen that slight deflection of the tongue is noticed; this is not to be considered as indicating paralysis unless some other symptoms are found.

Articulation, mastication, and deglutition are modified by bilateral palsy. Since the tongue is used to keep the food between the teeth, failure to do this is a convenient indication. The tongue also initiates the act of swallowing; the meaning of defective action here is also clear.

Irregular longitudinal folds in the mucous membrane of the tongue — not "geographical tongue," a functional disease — indicate atrophy of the muscles.

Defects of articulation are to be noted. The patient is required to pronounce certain letters. The occlusion sounds *p* and *b* are pronounced with lips tightly closed; paralysis of the lips makes it impossible to close them tightly, and these sounds become fricatives that resemble *f* and *v*. The occlusive sounds *t* and *d* are formed by pressing the tip of the tongue against the palate; in a case of paralysis the closure will be loosened and the two sounds will become *th*, as in "thin" and "thine." Other tongue sounds like *l* are also affected. When the soft palate is paralyzed, it cannot close off the nasal cavity from the mouth.

The sounds *p* and *b* require closure of the nasal cavity at the rear; when this does not occur, they become like *m*. For the same reason they lose their explosive character.

With bulbar paralysis of milder type the patient enunciates all the consonants imperfectly; syllables are often run together or omitted. Sometimes consonants are omitted or replaced by easier sounds or repeated. Special difficulty is found with *r*; a familiar phrase is "third riding artillery brigade." Other classical tests of paretic speech are "Peter Piper picked a peck of pickled peppers," "Massachusetts assurance security," etc.

B. Trunk and Extremities

General. — The examination is to be one of the condition of the muscles and the activity of the reflexes. The patient is to stand in the anatomical position or to lie down. Unilateral lesions show themselves in differences between the two sides. Hypertrophy, due to use, may be present on the sound side; this must be allowed for in cases of unilateral lesion. The examiner should be trained to hold in mind a picture of the normal conditions, otherwise a bilateral lesion may escape notice.

Skeleton. — The development of the skeleton and its departures from the normal are noted, the standard being the normal condition for the patient's age, sex, and station in life. Deformities are looked for.

Muscular Size. — The muscular examination is made by feeling the muscle at rest, in moderate contraction, and in strong contraction; its firmness, softness, etc., are noted. The degree of atrophy or hypertrophy is also to be decided upon. The sizes of the muscles can be estimated by the eye if it has been well trained by the observation of normal cases. This makes it possible to dispense with comparative measurements. When such measurements are made they usually include the following: —

Length of arm, from acromion to end of middle finger.

Length of leg, from anterior superior spine of ilium to inner malleolus of ankle.

Circumference of upper arm at largest part of biceps.

Circumference of forearm at largest part just below the elbow.

Circumference of wrist.

Circumference of thigh at the gluteal fold.

Circumference of thigh at its smallest part, just above knee.

Circumference of leg at the largest part, *i.e.* the calf.

Circumference of leg at its smallest part just above ankle.

A steel tape with automatic wind-up is used for these measurements, as its tension is uniform. Differences of one-half to three-quarters of an inch may be within the normal physiological variations; they are not to be considered as pathological unless some other signs of disease are present. During the measurements the parts should be so held that the position in each one of the pair considered should be the same; the tension should also be constant. All variations from the normal position should be noted.

Muscular Power. — The examination should proceed systematically from the proximal to the distal parts of the extremity. The strength of contraction in any case is best judged by resisting its action. Even in cases where no resistance is encountered, the muscles may be sufficiently strong to move the limbs, particularly if gravity happens to aid. By placing the hand on the muscles in action the examiner can feel their character and firmness. The dynamometer is used to measure the power of the hand-grasp. It consists of a spring which opposes the closing of the hand. The

force exerted by the hand is automatically indicated on a dial. It is grasped in the hand and squeezed as hard as possible; care is to be taken that the arm is freely extended and that all artificial support for the extremity is avoided. The ratio of 5 to 7 indicates the relation of power between the right and left hands. This is reversed in left-handed people. Ordinarily it is sufficient for the examiner to have his hands grasped by the patient; he can then feel any difference between the two. He should give his right hand to the patient's right hand and his left to the left, just as in shaking hands; both should be done at the same time.

Defects in segmental movements, such as that of adduction, abduction, flexion, and extension, should be looked for in examining for hemiplegia and similar cerebral diseases. The reason for this is that *movements* are represented in the brain and not *muscles*, as in the spinal cord. In diseases of the spinal cord, such as anterio-poliomyelitis, each muscle or group of muscles is examined separately.

In cases of *actual paralysis* its range and completeness, and also whether it is flaccid or spastic, are recorded. Inasmuch as the terms "paralysis" and "paresis" differ only in degree, by common

consent the term "paralysis" is now applied to all grades of the muscular deficiency and should be so used, subject to qualifications of degree and character if so desired, in the case record. When the spastic paralysis is so strong that it cannot be overcome by ordinary effort the degree of permanent contracture is noted. "Positive contracture" is the term applied when the paralyzed muscles have shortened, as in old hemiplegias; "negative contracture" is employed when the unopposed muscular antagonists have produced the deformity, as in old spinal palsies. "Hypotonia" indicates a condition of diminished muscular tone, as in tabes; it appears in the extreme extension of the joints by passive means. One should test for varying degrees of flaccidity in the unconscious state of hemiplegia; thus the paralyzed limb, if raised, falls like a weight, influenced only by gravitation, while the normal limb falls less suddenly.

Tremors. — Tremors are recorded as to their range (fine or coarse), their frequency (slow or fast), and their variations in regularity and equality. The observations are to be made while the muscle is at rest, in simple and complex action, and under emotional excitement. For the former case the limb or head should be rested on a support so that the muscles are fully relaxed.

The tremor can nearly always be seen if it is present. When it is very fine, it is sometimes necessary to touch the part in order to feel the tremor. To test for tremor in action, the extremity is voluntarily raised or extended. This may make a tremor apparent or accentuate or diminish one already observed with the extremity at rest; a fine tremor may be changed to a coarse one.

The fibrillary tremor is a special form; it consists in jerks of individual bundle-fibres, or of a wave-like contraction that attacks one bundle after another in quick succession so that the whole muscle is agitated as if a wave were going over it.

Intention tremor (or action tremor) is a special condition which shows itself when the muscles are at increased tension; it is a quaking, coarse tremor that appears when the patient attempts to perform a voluntary act; it is observed specially in moving the arm. The usual test for bringing it out is to ask the patient to bring his index finger from behind him slowly to the point of his nose; if the action tremor is present, his arm wobbles around so that he can touch his nose only with difficulty.

Spasm. — This is often apparent to the eye, but simple inspection furnishes often incomplete or defective knowledge. For accurate judgments the

hand is to be placed on the parts affected. The spasm may be tonic or clonic. It varies in degree of bodily movement, in range of muscle movement, in duration, and in rapidity. All these points are to be recorded.

Spasm is frequent in disease of the spinal cord and its membranes. It may be tonic in character, which, when persistent, is designated as *rigidity*. Clonic spasm is usually transient and paroxysmal. Focal persistent tonic spasm causes distortion of the parts to which they are attached and induces what is known as contracture. The reverse of this condition is termed muscular hypotonia.

Convulsions. — Transitory post-convulsive weakness should be especially noted, as it is a much more certain index of organic disease than the mere local commencement of spasm. The aura or premonitory sign, tonic or clonic spasm, degree and character of loss of consciousness, should be noted. The local commencement and order of muscular march in the Jacksonian fit should be recorded, as the place at which the sensation of movement begins points to the seat of instability in the brain. It is essential also to note whether there be a primary and secondary deviation of the eyes and head in the fit. If the head and eyes are turned first to one side and then later to the

other, it indicates a Jacksonian order of onset in the fit.

Incoördination. — The test for the upper extremities is to require the patient to touch suddenly with the finger or a pencil different parts of the body; this is done first with the eyes open and then with the eyes closed. The degree and the nature of the incoördination are noted. The direction of movements depends upon sensory elements. Incoördination interferes with voluntary movements, and *vice versa*.

To test the incoördination in a lower extremity the patient is required to raise his leg while lying down. The ataxia shows itself in the fact that the leg is not raised directly vertically, but makes all sorts of movements — specially side movements — while being raised. In letting it down, it is not simply lowered, but is flung down violently in an unnatural position.

Incoördination in the lower extremities is also tested by having the patient stand with his eyes closed and his feet close together. In mild cases he may be required to stand on one foot. Swaying forward and backward or from side to side occurs to a slight degree with all persons; a great many apparently normal persons sway a great deal. Neurasthenics may or may not do so. Incoördi-

nation due to disease produces considerable swaying; the patient may tend to fall or may even fall. This condition is known as "static ataxy," or Romberg's symptom.

Another test for incoördination in the lower extremities is carried out by having the patient walk to and fro; he should also be called upon to "about-face" quickly. In milder cases he is required to walk a line or crack in the floor and to turn sharply around at command. Slight degree of defective equilibration is often shown only in the act of turning. The symptoms are usually increased if the patient walks with his eyes closed. In certain spinal cord affections there may be irregular movements when the guidance of vision is withdrawn and the base of support is rendered small by a juxtaposition of the feet. The delicacy of the test is further enhanced by having the patient remove the firm base of support of the boot.

In this connection it seems advisable to summarize the chief types of walking. The *simple paretic walk* arises from muscular weakness. It shows itself in slowness of the movements and shortening of the steps. The active movements of the legs are less extensive, but an excessive bending of the knees can occur. The *partially paretic walk* occurs when only single muscles or groups of

muscles are lamed. A particularly frequent and typical form occurs with paralysis of the peroneus. The foot of the swung leg falls downward. As the leg is thus lengthened the patient has to bend the extremity excessively at hip and knees. The foot makes two noises as it strikes the ground; the walk has been compared to that of a horse. The *spastic paretic walk* occurs when muscular stiffness is combined with weakness. Owing to the stiffness, the movement is slower and less extensive. The leg is moved somewhat as a whole. Specially characteristic is the scraping of the toe along the floor; this occurs because the contraction of the muscles of the calf can be overcome only slowly and with difficulty. The pelvis is usually raised on the diseased side to compensate for the deficient flexibility of the leg. In extreme cases the toes remain on the floor and the patient shoves them forward in short steps. If the adductors on the thighs are more powerful, the knees are rubbed together and the legs crossed. The *ataxic walk* has been described above. The *cerebellar-ataxic* form shows itself in two types, which may be combined: (1) one resting upon vertigo and disturbance of equilibrium, whereby the walk greatly resembles that of a drunken person; (2) another depending on ataxia, whereby

the patient walks with separated legs and stamping movement, but without any excessive swinging. In this case he stands with legs apart; we can observe continued jerks or momentary tensings of the foot- and toe-extensors. A sharp distinction of this type from the spinal ataxic walk can be made only when type 1 is also present. The *tremor walk* occurs when every simple muscular action is replaced by great tremors (multiple sclerosis, hysteria). *Painful walks* are of various kinds, according to the location of the pain.

Trunk Muscles. — The examiner holds the finger at the level of the umbilicus and requests the patient to sit up. The umbilicus will rise one to three inches, according to the degree of paralysis of the rectus abdominis.

Spine. — This is examined for deformity and tenderness. To determine tenderness lay the flat hand or the fist over the vertebra in which the disease is suspected, then strike this forcibly with the other fist.

Reflexes. — Two kinds of reflex action are to be examined for. The first is that shown chiefly by stimulating the nerves of the skin. The second is produced by the stimulation of deeper nerves, chiefly those of the muscles. This latter form of reflex action is brought out, among other ways,

by tapping a tendon. The order of examination should be as follows: —

Superficial	Deep
Conjunctival and corneal	Pupillary
Cilio-spinal	Trigemino-facial
Scapular	Jaw-jerk
Abdominal and epigastric	Pectoral
Cremasteric	Elbow — biceps and triceps
Gluteal	Wrist — supinator and ulnar
	Knee-jerks
	Achilles
	Front tap
	Babinski

The following details concerning the method of carrying out the tests should be carefully noted. Careful examination of the loss of superficial reflexes is sometimes of great importance, as their absence occurs often when the motor paralysis is slight.

The skin reflex action may be caused at almost any part, but at some parts they are very definite in character and are in consequence given special names. There are many special skin reflexes. They vary in different individuals and are always more readily produced in the young than the old. They are increased and abolished by disease.

To test the *conjunctival* and *corneal* reflexes a twisted bit of cotton-wool is touched to the eye, contact with the eyebrows being carefully avoided.

The *cilio-spinal* is tested by pinching the skin at the nape of the neck; the pupils should be seen to dilate. The skin reflexes are excited by gentle stimulation, as a light, quick or slow stroking of the skin rather than by a strong painful impression. The reflex response is noted as quick, slow, or extensive, in proportion as they show the reaction to the stimulation, the nature of the reflex centre and its condition at the time of examination. Care should be exercised not to make too strong stimulation of the skin, as not infrequently a very wide reflex response may be caused, involving most of the muscles of the body, and thus obscure the very local response desired. As a rule, a painful impression causes quick flexion of the limb, such as may be necessary to withdraw the part from the cause of the pain; when withdrawal is impossible a protective movement results, as in case of the eyelids. The *scapular* is brought out by stroking the skin between the shoulder blades; the inner lower angles of the scapulæ move toward the spine. The *epigastric* reflex is brought out by a quick, sharp stroke of the finger-nail or the end of a match along the free border of the ribs. Strok-

ing the hypogastrium brings out the *hypogastric* reflex. The *cremasteric* reflex consists in a sharp retraction of the testicle when a stroke is made along the inner side of the thigh. The *gluteal* reflex is produced by irritating the skin just above the gluteal fold. The *plantar* reflex is produced by stroking the sole of the foot; the foot is retracted.

The deep reflexes are of greater clinical significance, and every precaution is to be taken to exclude error.

To test the *pupillary* reflex the patient faces a window so that both eyes are equally lighted; the examiner alternately and conjointly exposes and screens the eyes with his hands. "Light action" is shown if the pupils respond by contracting and dilating; "light inaction" when they do not do so. To test the reaction of accommodation the patient is required to fix alternately a near and a distant object—both objects being equally lighted. If the pupils dilate and contract under the influence of the different degrees of convergence, the result is recorded as "far and near action." When far and near action is present with light inaction the condition is known as the Argyll-Robertson pupil.

To exclude confusion of the light test with that

for far and near action, the patient, in a dimly lighted room, may be required to definitely fix some point such as the examiner's nose; a match or a candle is then brought from behind the patient's head to a position in front of the face so that the rays of light may fall upon the pupil. The reflected light from a mirror may also be used. This excludes pupillary accommodation to distance.

To show the *jaw-jerk* the finger is tapped while it depresses the lower jaw during slight muscular tension.

To obtain the *biceps-jerk* the forearm is placed at a slight angle with the arm; a finger, which is laid on the biceps tendon, is tapped. A direct tap on the muscle tendon above the olecranon brings out the *triceps-jerk;* the arm is partly supported by the examiner, the forearm being allowed to hang loosely. To obtain the *supinator-jerk* a direct tap is made on the muscle midway between the elbow and wrist while the forearm is moderately flexed. The *ulnar-jerk* appears by striking the tendon of the extensor carpi ulnaris or the shaft of the ulnar bone where it becomes subcutaneous.

The most important muscular reflex is the *knee-jerk.* The knee to be tested is flexed nearly at a

right angle by being placed over the other knee while the person sits. In this position the quadriceps is gently extended. The patellar tendon is struck over the space above the tibia where it can yield if there is a sudden increase in the tension of the muscle. The quadriceps contracts and the lower leg is jerked forward. If the leg is too stout, the tension in this position may be too great to permit any movement. The examiner may place his arm beneath the patient's thigh just above the knee and rest his hand on the other knee. Positions more favorable to muscular relaxation are sometimes found by letting the leg hang vertically or by resting the foot lightly on the floor. The contraction may be felt by the hand on the quadriceps. There should be no confusion between the recoil and the actual reflex movement. Attention to the leg leads to contraction of many of its muscles, whereby the reflex may be partly or wholly suppressed. Attention is diverted by having the patient hook his hands together and pull hard; the eyes are closed (Jendrassik). The reflex is increased by being freed from opposing muscular contractions; such an increase is termed "reinforcement." It is, in fact, necessary to guard against contraction of the flexors; precautions can be taken by feeling the hamstring ten-

dons; pressure on these often produces relaxation. The blow may be given with the side of the hand, the tips of the fingers, a percussion hammer, or a continental stethoscope with a rubber edge. When the jerk is doubtful the skin should be bared.

The knee-jerk may be aroused by other means of suddenly increasing the muscular tension, especially in condition of great excitability. It may be sufficient to strike a blow on the tibia. Another way to excite the reflex is to jerk the patella downward while the patient is lying down with the muscles relaxed. This test can be made a very sensitive one by holding the patella down with a finger across the upper edge and then tapping this finger so as to suddenly increase the tension; the reflex is obtained even when there is only slightly increased excitability. If the tension is maintained after the tap, repeated rhythmic jerks may be produced while the tension lasts in cases of great excitability of the muscle clonus.

The *Achilles reflex* is aroused by gently pressing the foot up to increase the tension of the calf muscles and then tapping the tendon; the calf muscles contract and slightly extend the foot. The tap may be on the back or the side of the tendon. If the foot is held so that it cannot yield, the contraction may be felt by the hand over the

calf. The blow on the tendon does not cause the reflex directly; it suddenly increases the muscular tension and this arouses the contraction. Instead of a single reflex movement the blow may arouse a clonus (the ankle clonus) if the excitability of the calf muscles is excessive.

To bring out the *front tap* reflex the tibialis anticus is smartly tapped with a hammer or stethoscope while the foot is flexed dorsally by the examiner. The examiner holds the ankle on his knee or puts it on the edge of a stool slightly lower than the chair on which the patient sits; if the patient is in bed, the leg is extended. The foot responds to the tap by plantar flexion.

Babinski's toe-reflex requires some care to exclude complications; the foot should be warm, and the leg should be partly flexed to aid the muscular relaxation and to avoid the occurrence of voluntary movements. The thumb-nail or a match is stroked more or less slowly along the outer sole of the foot. Normally the big toe is flexed plantarward; if it is flexed dorsalward, or if the tendon of the flexor longus proprius is seen to flick up although no actual toe movement follows, the Babinski sign is present. Movements of the other toes — whether coinciding with that of the big toe or not — may be disregarded.

Electrical Examination. — The sponges must be kept moist by a weak solution of salt or baking soda. The indifferent electrode is put over the sternum, the sacrum, or the nape of the neck. The patient must completely relax the muscles. The exciting electrode must be small. Frequently less current passes during the first two or three applications of the shocks; the amount of current should be therefore always controlled by galvanometer readings. The intensity of the current must be the same in both cases, otherwise a polar change cannot be inferred. In the absence of definite polar change *slowness of muscular contraction* indicates slight R. D. in milder stages of nerve degeneration. The less painful isolated induced shock is preferable for children and sensitive individuals. The examiner should in every case first test the current on himself, both for safety and also to minimize the patient's fear of the proposed test. The first test is to be made with the faradic current; if the reaction is normal, the galvanic test is unnecessary. If the response to faradism is diminished or lost, galvanism may be employed for prognosis. The weakest galvanic current which will elicit a response is to be always employed. When the responses to both poles are slightly but equally diminished, the degree of abnormality

can be found by comparing the diseased side with the corresponding parts of the sound one; when the lesion is bilateral, an analogous part of a sound extremity may be used as a standard. When the test is negative to a current so strong that it can be borne without great pain, the response is said to be "lost." For practical purposes it is not necessary to try for the response that might still be gained in such cases under anæsthesia. The motor points of the face, arms, and legs are shown in Fig. 14 to Fig. 19 inclusive.

Different individuals and different parts of the same individual show differing degrees of sensitiveness of the skin. The resistance to the electrical current varies likewise, and the current must be increased when it is greater. The need of the galvanometer is evident. The current actually used should be known. When the patient's sensitiveness to pain prevents the use of this instrument in all measurements, it may be used once to gain information as to the significance of the number of cells that constitute the evidence of the difference between the two sides. In complete reaction of degeneration, percussion should be applied to the muscles to see if mechanical excitability is also present; it shows itself by slow muscular con-

traction in the part struck. The contraction of the muscle is continuous when the faradic current is applied; but if isolated shocks of this current are applied, brief, momentary contractions are caused. When voltaic current of moderate strength is applied, contraction occurs only when the current is changed in strength or when the current is "made" and "broken." In proportion as the nutrition of the nerve fibres is impaired, their excitability is lowered and a stronger current of each kind is required to excite them and cause contraction in the muscles they supply. When there is doubt whether the voltaic current is acting through the nerve endings or on the muscle fibres themselves in neuritis, the slow contraction and its longer duration proves the latter to be the case. Sometimes there is a slight abnormal tetanic contraction during the passage of the current. During the period of increased voltaic irritability the mechanical excitability of the fibres is often increased, and if they are percussed directly, they respond with a distinct, slow contraction.

C. Sensory Examination

Touch. — In testing the sensibility of the extremities one should examine circularly around the

limb to note whether the disorder corresponds to spinal cord segments, which constitute the so-called spinal cord type of anæsthesia, or to the sensory defect of the cerebral type, sleeve- or glove-like anæsthesia, which is best revealed by testing sensation up and down the limb.

Touch is tested by contact. It is change of contact that arouses sensation; prolonged, uniform contact at one place is perceived only by close attention. Beginning contact is more effective than its cessation. The effect of the change depends on its rapidity. A sudden touch is observed no matter how light it is; a firm pressure is scarcely noticed if it is gradually applied. The test for contact should be a pure one, not obscured by sensations of heat or cold. This is a defect in using the finger as a test object; cotton is therefore employed. The patient, with closed eyes, is required to tell when he is touched. Points are touched irregularly over the skin and at irregular times. Sometimes the patient is asked if he feels a touch, when no application has been made; some patients are apt to have such illusions. The contact should not be too gentle. When the skin is thick, light contacts are often not felt even by normal persons. The examiner should try the tests on himself in order to regulate them. The

patient should be required to name the part touched and to localize it with the finger. The term "sensibility to touch" should be used instead of "anæsthesia," as the latter is often inaccurately used. One should always test sensation at the level of the cord lesion as well as that below, and remember that the "level of lesion" may involve either the limbs or trunk, or both. Anæsthetic areas may be found on the trunk when there are none on the limbs (spinal caries).

Simple increase of the sense of touch is really due to a perversion of the sensation of touch. The sensation may be described as "thrilling" or "shocklike." In cases of extreme increase, touch may produce pain, but this symptom should be noted as a stimulation of the oversensitive nerves of common sensibility rather than pain due to a disturbance of the tactile nerves. Touch may cause pain when it is not appreciated as touch. In certain spinal cord diseases one finds impairment of pain and temperature with retained tactile sensibility (syringomyelia). Careful analysis and record should be made of the spontaneous sensations other than pain. Variations in these sensations are often indescribable, but the observer ought to try to elucidate their character without leading the patient.

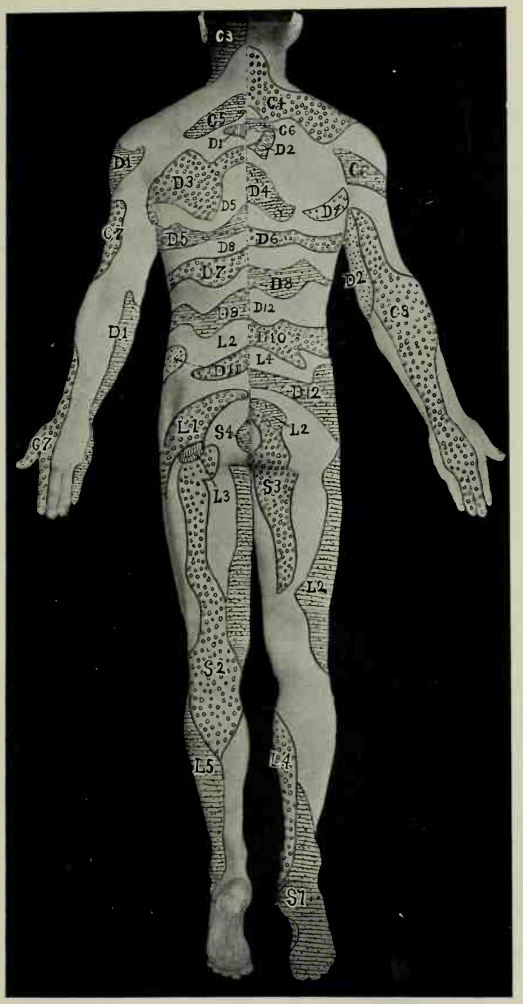

FIG. 21. Back View.

Another test of touch involves the smallest distance at which two points applied to the skin can be felt as two. At a shorter distance apart they appear as one. Ordinary dividers with dulled points may be used; a more convenient "æsthesiometer" is that of Sieveking, in which the points are attached to a graduated metal bar. The points must be applied to the skin simultaneously and with equal degree of pressure. The examination requires time and patience. Practice gives the patient increased sensitiveness. The defect must be very marked in order to give results that are conclusive. The test is not as valuable as once supposed.

The minimum distances at which two points can be distinguished are as follows: —

Tip of tongue	1.5 min.
Finger tips	2 to 3 min.
Lips	4 to 5 min.
Tip of nose	6 min.
Cheeks and back of fingers	12 min.
Forehead	22 min.
Neck	34 min.
Forearm, lower leg, back of foot	40 min.
Chest	45 min.
Back	60 min.
Upper arm and thigh	75 min.

The distance is smallest at the tip of the tongue — that is, the sensitiveness is greatest.

Different individuals show variations in the relations from those in the table; variations that are proportional all over the body are probably physiological.

Pain. — The nerves of common sensibility carry the sensations of pain. The test is usually made with a blunt pin-point. A needle should not be used; its point is too fine. It may penetrate the skin. Moreover, it may not be felt at all where the nerve endings are not close together in case it happens to strike between them. The test may be made with a fine wire from a faradic battery, but the test must be made with great care and the current must be carefully graduated if accuracy is to be gained over the pin-point method. Simple touch may produce pain if common sensitiveness is greatly increased. Sensations distinctly abnormal, such as thrilling, tingling, etc., may be produced by both tactile and painful impressions.

Sometimes the prick is perceived first as a touch and afterward as a pain (as in tabes). The patient may name only the first one; he should be required to name each as it appears.

The fingers should grasp the pin so as to expose

only a certain portion of the point; in this way the test is kept uniform. Sensitiveness to pain is often diminished but not lost. Frequent comparisons to some standard in another part of the body should be made in order to avoid the source of error just mentioned, and also the errors arising from mistaken and varying notions of the patient as to the degree of pain which he should recognize. The disagreement and unreliability of many examinations are to be largely attributed to those sources of error.

Temperature. — Hot and cold spoons, or a hinged-tongue depressor with one blade heated, or two similar test-tubes with hot and cold water may be used. The degrees of heat and cold must be sufficiently marked to justify us in regarding the patient's doubt as pathological and not as due to lukewarmness of the testing object. To determine the power of differential discrimination large test-tubes containing thermometers are filled with water of known temperatures.

Temperature is usually affected together with sensibility to pain, but not often in the same degree; one may be impaired without the other, as in syringomyelia. This is different from the case with touch, where sensibility to pain may vary though touch is intact. There may be abso-

lute loss to both heat and cold. Slight diminution in the sensitiveness to temperature may pass undetected.

Although in some cases considerable degrees of difference are correctly felt, a quality of difference may be perceived analogous to that noted in the perception of difference of pressure. Hot objects may feel cold, and *vice versa*. Objects of ordinary temperature may arouse sensations of pain, or heat may be less readily perceived than usual. Delay in the perception of temperature is found in the cases where such a delay in the perception of a pin prick occurs. Normally, temperature is less quickly perceived than pain, because time is required to raise the temperature of the skin sufficiently to enable the heat to penetrate its nerves.

The accuracy of the test of the pain sense may be verified in a rough way by a test-tube with water hot enough to produce pain normally.

The examination for each of the two senses, heat and cold, should be kept separate, because the nerves for the two are different; the nerve endings are distributed differently over the skin. One set of spots feels heat, another set, cold.

Figures 20 to 23 inclusive give the sensory areas corresponding to the various segments of the spinal cord.

Muscle Sense. — This includes also *muscle-pain*

sense. To test the sensations from the muscle fibres the belly of the muscle is gripped; the uncomfortable or painful sensations are compared with similar sensations from muscles known as sound. Postural sense is a compound of sensations from the skin, joints, and muscles; it is tested by the parts while at rest or in action. Resistance to contraction is tested as follows: the patient, with closed eyes, tries to detect differences in weight between pairs of objects, such as leather balls the size of golf balls weighted to degrees between two drachms and two pounds. The skin furnishes part of the sensations in this test, but this complication can be diminished by placing the weight in a bag suspended by a string from the part tested; or increase the area of the suspension in order to diffuse the skin impression in a diminished degree over a large area; or increase the weight and therefore the pressure in both area and degree so that the addition to be discovered shall bear only a small proportion to the total. A difference of one-fortieth may be distinguished by the muscle sense; the skin has a much duller sensibility. It is not practical to apply an electrical test to the skin. Application to the muscle is possible only after anæsthetizing the skin by cocaine.

The ability to recognize passive posture is a rough but practical test for muscular sensibility. The patient's eyes are closed. A limb is seized by the examiner and placed in some position. The patient tells the position or places the limb of the other side in the corresponding position, or indicates the direction of the movement with the fingers. If the skin is normally sensitive, the examiner should take care to grasp the limb firmly and press on both sides so that the posture may not be judged by the direction of pressure. The examination should be repeated several times to avoid error.

Outline figures are made specially for charting the data concerning touch, pain, and temperature. See Figs. 24 and 25. This is far better than written descriptions, which are too confusing and obscure for rapid reference.

The astereognostic sense is that which recognizes form. It is tested by applying to the skin or giving in the hand of the patient with closed eyes such objects as keys, coins, etc., and asking him to describe their size, weight, and form.

D. General Functions and Viscera

Aphasia. — This is the term applied to a speech defect that is not articulatory. It must be tested in such a way as to show its exact nature. Motor

memory, visual memory, and auditory memory are involved. The patient's ability in speaking voluntarily and in repeating words spoken by some one else makes it possible to draw conclusions concerning his motor-speech centre and its association tracts. His visual memory is involved in his capacity to understand written or printed words; to write spontaneously; to write common things he sees (such as knife, button, etc.), which he hears, or which he touches; to copy writing; to understand written directions as shown by his ability to execute them. The integrity of auditory speech and its association is shown in the power of the patient to recall names of familiar objects seen, heard, touched, etc.; to understand ordinary speech, and to recognize musical airs (whistling *Star-Spangled Banner*, for example).

Vaso-motor and Trophic Disorders. — Ulcers, nutrition of skin, hair, nails, changes in color and heat of skin in different parts of the body — all these are signs that may be used in looking for vaso-motor and trophic disorders. A thorough visceral examination of the blood, urine, temperature, pulse, etc., is to be made; in addition to this the condition of the sphincter is to be specially noted in spinal affections. Three different conditions appear in urinary incontinence: (1) low-

ered cerebral function, as in tumor cases where neglect of the personal toilet leads to retention and final overflow; (2) paralysis of the sphincter, as in spinal paralysis; (3) mental defect, as seen in idiocy.

The following composite case-record is given to show how the facts elicited in the previous examination of the patient should be arranged: —

Exam. Oct. 1, 1907. William Johnson, 36, s., Eng., in U. S. 10 yrs.

Diagnosis: *Tabes Dorsalis*

Compl. of. — Sharp pains in legs and inability to walk in the dark. Duration, 3 yrs.

F. H. — P. Gf. d. insane, 53. M. Gm. l. and w., 82. P. g. uncle Bright's. 2d cousin imbecile and F. d. 43, alc. and tobacco. M. l. and w., 60. 1. (Boy) 26 (our pt.). 2. (Girl) 23, insane (dementia) (D. P. ?). 3. (Boy) epileptic from 8 yrs. 4. (Girl) 14, l. and w. Neurotic.

P. H. — Full term; l. normal but difficult, prolonged (18 hrs.), instrument. Artificially fed. 2 convul. at dentition. Measles at 3. Scarlet f. at 6. Rt. otitis m. Puberty, somnambulism 1 yr. School C. S. until 16. Fairly competent journeyman barber; always lived in N. Y.; married at 22; 3 child., 12, 8, and 6; all l. and w.; wife no misc. Alc. and tobacco to excess. Gonorrhœa at 18. S.

denied, but exposure admitted (20–24). Typhoid 40. Constipated 10 yrs.

P. I. — One year ago (Oct., 1904), dull paroxysmal headaches appeared suddenly without cause, most localized over right occiput; afternoons at first, then (3 mos. after) constant. Scalp tender to mild pressure; pain from headache radiated into right neck and shoulder muscles, marked stiffness and rigidity of the same; vomiting on rising in the morning almost daily during last 8 mos.; for 9 mos. a very unsteady gait; diplopia for 10 mos. at times corrected by prisms; some failure of eyesight past 4 mos.

P. C. — Well built, muscular, blond, German. Looks his age (36); appears rather depressed and dazed; walks with uncertain, reeling gait; tendency to walk to the right; eyes to floor; quite anæmic.

Motor, Sensory, and Special Sense

Cranial Nerves.

1. — Detects odors but poorly. Chronic catarrhal rhinitis for 6 yrs.
2. — Rv. 20/20. Lv. 8/20. Vis. fs. contracted; rt. to 30°, lt. contracted to 0°. L. O. D. congest. swelling ½ d. Disk margin hazy. Central œdema. Few hemorrhages. R. O. D. hazy disk margin, nasal; temporal pallor.
3. — 3, 4, and 6 ext. rectus weak, sec. deviation, erroneous project. 2 in., intermit. diplopia, corrected by prisms.
5. — Painful (sensitive to touch) in entire skin area (see chart); exquisite radiating pains on pressure

at first and second foraminal openings; vasomotor paresis marked; no motor changes; no taste changes.

7. — Rt. normal. Lt. entire palsy, most about eye. Complete R. D.
8. — Rt. = watch at 6″. Lt. = bone conduction only (labyrinthine disease).
9. — Liquids regurgitated through nose.
10. — Slight difficulty in completing act of swallowing. Resp. normal.
11. — Rt. sterno-cleido mastoid weak.
12. — Increased height to tongue in retraction, weak in left cheek; protruded, but deviates to right; articulation indistinct; first act of swallowing defective.

Upper Extrem.

(Motor)	*Scapula and Shoulder Joint* R.	L.
Trapezius	0	0
Rhomboids	0	0
Levator ang. scap.	weak	0
Serratus mag.	slightly weak	0
Deltoid	no action, atrophy marked	0
Supraspinatus	paralyzed	0
Infraspinatus	paralyzed and atrophied	0
Teres minor	0	0
Subscapularis	0	0
Latissimus dorsi	0	0
Pectoralis major	slight contract	0
Pect. minor	0	0
Teres major	slight contract	0

Muscles of Forearm and Hand

	R.	L.
Triceps	0	0
Br. anticus	weak	0
Biceps	marked atrophy, very weak	0
Sup. longus	0	0
Sup. brevis	no action	0
Pronators	0	0
Fl. of wrist	0	0
Ext. of wrist	weak	0
Fl. of fingers	contract	0
Ext. of fingers	0	0

Summary. — Weakness or paralysis and atrophy in supra- and infra-spinatus, deltoid, biceps, br. anticus, supinator brevis (Erb's palsy distribution).

Scapula and whole arm dwarfed; internal rotation of humerus; contracture-deformity at shoulder joint, elbow, and wrist. Internal rotators of rt. humerus in negative contract; may be partly overcome. Flexors of wrist in same condition of contracture.

Comparative Measurements

	R.	L.
Dynam.	33″	60″
Length of arm	21″	23″
Length of humerus	$11\frac{3}{4}$″	$12\frac{1}{2}$″
Cir. of arm	10″	$10\frac{3}{4}$″
Cir. of forearm	$10\frac{1}{4}$″	$10\frac{1}{2}$″
Cor. of wrist	7″	$7\frac{4}{4}$″

Measurements show atrophy and shortening largely in rt. shoulder and arm.

Trunk and Lower Ext. — Normal musculature in all movements; no atrophies.

(From a Case of Right Hemiplegia of Two Weeks' Duration.)

REFLEXES

Superficial

	R.	L.
Conjunc.	absent	0
Corneal	diminished	0
Cilio-spinal	weak	0
Scapular	absent	0
Abdom.	absent	0
Epigastric	absent	0
Cremasteric	absent	0
Plantar	weak	0

Deep

	R.	L.
Pupillary	0	0
Trigem.-facial	0	0
Jaw-jerk	0	0
Pectoral	exag.	0
Triceps	exag.	0
Biceps	exag.	0
Supinator	exag.	0
Ulnar	exag.	0
Knee-jerks	exag.	0
Achilles jerk	exag.	0
Front tap	exag.	0
Babinski	present	0

(From a Case of Ant.-Polio. M.)

Elect. Ex. — Rt. Ant. tibial = R. D. partial.
Rt. Ext. peroneal group = R. D. complete.
Sensory Ex. — Touch.
Pain.
Temp.
Muscle sense.
Muscle-pain sense.
(From Case of Unilateral Crush of Cord D. 11′. See Chart, for manner of charting sensory data. Figs. 24 and 25.)
On side of lesion: Skin hyperæsthesia D. 11″.
Muscle sense impaired.
Temp. slightly raised D. 11″.
On opposite side to lesion: Loss of sensibility D. 11″.
Muscle sense normal.
Temp. normal.
(From a Case of Right Hemiplegia in a Woman.)

Disorder of General Function (Organ. Reflex); Visceral Ex.: —
Partial motor aphasia.
Repeats words slowly and imperfectly.
Asthmatic; temp. 99° F., pulse 74, normal.
Rectal and vaginal ex. neg.
Mitral regurg.; severe arterial sclerosis.
Urine normal; blood not exam.
Weight, 93 lbs.; height, 5 ft. 6 in.
Vaso-motor and trophic disorders.
Ulcer on rt. buttock (pt. bed-ridden).
Skin dry and scaly, hair and nails brittle on rt.
Blueness and coldness of exts. on rt. side.

The first page of the history blank should be reserved for a short synopsis of the chief symptoms upon which the diagnosis rests. It may be arranged as an epitome of the complete record detailed here at length.

Part II

CHAPTER I

Part II of the book is designed to aid the student and practitioner in making and recording examinations of insane patients and in acquainting themselves with the more common forms of insanity. There is described first the method of taking the history and the method of making the neurological and mental examinations. Specimen cases are then given which demonstrate these methods and give an insight into the more common forms of insanity. At the end is appended a glossary of the common terms used in psychiatry.

In mental disease it is of the utmost importance that the student employ a definite routine method of examination of the patient. Any method to be satisfactory must include (*a*) the anamnesis of the family, (*b*) personal history previous to the disease, (*c*) the anamnesis of the disease, and finally (*d*) the status præsens.

(*a*) The importance of heredity as an etiological factor necessitates a careful consideration of the

family history, not only as regards the presence of mental and nervous diseases, but also evidences of defective physical constitution. This can *never* be elicited by simply asking the general question if there is a history of insanity or nervous diseases in the family, but it requires a detailed inquiry into the habits, traits, and physical illnesses of all the members of the direct branches of the family, laying particular stress upon mental peculiarities, alcoholic and other addictions, and criminal tendencies.

(*b*) The *personal history* should begin with an inquiry into the conditions attending gestation and birth, such as exhausting diseases, deprivation, severe emotional shocks, mental anguish, and birth trauma. In *infancy*, there is the presence of infectious diseases and their sequelæ, convulsions, head injury, paralyses, and the tardy appearance of walking and talking, and in *childhood* the progress in school and conditions accompanying puberty and menstruation, also the existence of masturbation, sexual impulses, peculiar emotional manifestations, timidity, morbid temperaments, religious experiences, etc. If married, the conditions attending child-bearing should be known, as well as severe illnesses, such as typhoid fever, injuries, mental shocks, and deprivation; and if

employed, the character of the work, the materials handled, the sanitation and undue physical and mental strain, excessive indulgence in eating, drinking, and amusement, and also drug habituation. Personal idiosyncrasies, exaggerated egotism, one-sided intellectual development, with attainments in one field and lack of development in another, should be included in your list of inquiries. In eliciting such facts it should be borne in mind that *general questions are wholly inadequate.* It requires close and detailed questioning, and even then important facts are very apt to be overlooked.

In determining the cause of the disease, one should guard against mistaking for causes the actual early symptoms of disease, such as the excesses of the paretic, the self-condemnation of the melancholiac, and the masturbation of the hebephrenic.

(*c*) In eliciting the *anamnesis of the disease,* particular attention should be paid to the character of the onset and the symptoms to date. In securing this information it is usually most satisfactory to follow the outline prescribed for making a mental status (see (*d*) below), *i.e.* elicit information concerning the presence of hallucinations or illusions, of disorders of apprehension, attention,

memory, orientation, train of thought, judgment, and in the emotional and volitional fields at various stages in the development of the disease.

It is often difficult to determine the actual date of onset of the disease because the initial change in disposition is sometimes so insidious that the true significance of certain peculiarities is not appreciated until emphasized later by the occurrence of the more striking symptoms. In case there have been one or more previous attacks of mental disease, there should be the same careful inquiry not only into the character of the symptoms presented at these periods and their duration, but also particularly as to whether the patient fully recovered or suffered residual defects in some field of the mental life.

(*d*) **Status Præsens.** — This examination should include observations of both the physical and mental condition of the patient. In view of the fact that many persons are particularly sensitive about undergoing a mental examination, it is desirable to begin with the physical examination. During it there is always opportunity to frame questions in such a way that the answers will give valuable information as to the mental state; as, for instance, the memory can be determined by

questions as to the date of appearance of certain physical signs, or the orientation may be ascertained by questions as to those who are caring for them, by whom their food is prepared, etc. Indeed, the great variety of physical symptoms to be inquired into offers sufficient chance to cover all fields of the mental status; even hallucinations and illusions of hearing and sight may be disclosed during the examination of the senses of hearing and sight.

The general survey of the body should include the state of nutrition, the present body weight compared with earlier weights, the presence of anæmia or cachexia, signs of premature senility or delayed pubescence, also evidences of so-called physical stigmata, as harelip, malformation of the palate, of the ears or sexual organs, albinism, congenital strabismus, malposition of the teeth and eyes, etc. Trauma, scars, and residuals of previous diseases should not be overlooked, and particularly those of syphilis. The physical examination should be careful enough to eliminate such chronic diseases as chronic nephritis, uræmia, diabetes, pernicious anæmia, Graves's disease, tuberculosis, syphilis, lead poisoning, and chronic gastritis. The condition of sleep and of the gastro-intestinal tract needs special attention because of

the frequency with which disturbances exist in these fields.

The examination of the *nervous system* should be thorough and include the examination of the functions of the cranial nerves, the general muscular system, and the motor and sensory nerve functions of the trunk and extremities. A detailed method for this examination is comprehended in Part I of this book (see pp. 3–52) and need not be reiterated here. There are, however, methods which are especially applicable to mental patients which will be presented here.

The measurements of the cranium will give some indication as to the development of the cortex, but it is of more importance to observe the disproportion between the cranium and the rest of the body. The circumference of the skull taken along the line just above the external occipital protuberance and the glabella should measure in an adult between forty-eight and fifty-six centimeters, while the distance between the extreme lateral points as taken by a craniometer should be between fourteen and fifteen centimeters. The examination of the eye grounds is particularly essential as it often reveals vascular sclerosis, which might otherwise escape

notice.* Likewise, a careful examination of the ears sometimes discloses a sufficient cause for peripheral hallucinations.

In examining the muscular system, one may have considerable difficulty in determining the condition of muscular tonicity and in eliciting the deep reflexes, because of lack of coöperation on the part of the patient and an inability to secure complete relaxation. The patient should be in a comfortable and restful attitude, such as a recumbent position, with his attention distracted by engaging him in conversation, giving him

* In a recent communication by Clark and Tyson before the New York Neurological Society important observations were made upon eye changes in dementia præcox. According to these authors there is a slight grade of optic neuritis (in which tortuous veins and absent central cupping, paling, hazy disk margins going over to anæmic pale disks and partial atrophy), narrowing of the visual fields, corneal insensibility, negative Pilcz-Westphal, cilio-spinal, and psychic reflexes. These symptoms taken together constitute the eye syndrome of dementia præcox.

Observations soon to be published by Diefendorf and Dodge on eye movements in dementia præcox are also of considerable importance and seem to give an additional positive symptom in dementia præcox. This symptom consists in an increasing inability to develop short-lived motor habits; that is, an ininability of the eye to follow the swing of the pendulum with perfect coördination and without certain characteristic interruptions.

figures to add or something to read aloud. In eliciting the knee-jerks, if the patient is lying on his back, place the left hand beneath the knee and gently lift it, allowing the foot to rest on the bed. If you find the leg relaxed, strike the tendon at any time. Frequently the patient will not relax until you have raised the knee high enough so that it will support itself in that position. If the patient is sitting, he should recline backward in an easy posture, with both feet squarely on the floor and brought as far forward as possible without causing the toes to leave the floor.

The ankle clonus is best elicited now by slipping the right hand under the toes and sole of the foot and quickly jerking the foot upward for a few inches, so that the weight of the elevated leg and thigh rests on your hand. The Achilles jerk is determined by asking the patient to stand leaning forward and supporting his weight by placing his hands on the top of a table or back of a chair. The ankle is then lifted in the rear and allowed to rest on your knee, when the tendon is struck. The other reflexes — the jaw-jerk, the biceps, the triceps, the supinator and the ulnar jerks, the front tap and the Babinski reflex — are elicited in the usual way (see pp. 34–41).

Further in the examination of muscular in-

coördination, in addition to the usual tests (see pp. 31–34), one should always include the closing of the eyes, opening the mouth, and protruding the tongue upon command, and then reversing the order. The same test is also suitable for eliciting facial tremor. The muscular tests should also include voluntary writing and speech, reading aloud, as well as the enunciation of difficult words, such as "electricity," "Ninth Riding Massachusetts Artillery Brigade," "around the rugged rock the ragged rascal ran." In this way there may be elicited scanning speech, hesitating speech, slurring speech, and explosive speech.

In the *sensory* examination it is advisable to employ the simplest implements, such as a fresh bit of absorbent cotton, a pin, and small, similarly shaped bottles filled with hot and cold water, and for the stereognostic sense, such pocket articles as a coin, a pencil, etc.

Vaso-motor, secretory, and trophic disorders should be recognized and recorded, particularly cyanosis of the extremities, dermography, glossy skin, canities, alopecia, onychogryphosis, nævi, herpes, scleroderma, and hyperidrosis; the various trophic disorders of the bones and joints, including spontaneous fractures and hæmatoma auris.

In the examination of the pulse there is nothing to be found peculiarly characteristic of any special form of mental disease. The blood pressure in fearful and depressive states is usually elevated, and lowered in manic states corresponding with the vaso-motor symptoms ordinarily accompanying these states. The fall in blood pressure observed in the end stages of paresis is in accord with the progressive terminal cardiac weakness. The examination of the blood has been thus far unproductive of characteristic disorders. In any given psychosis the blood states may vary considerably in the different stages. In the psychoses studied by us — dementia præcox, manic-depressive insanity, and dementia paralytica — the only apparently characteristic blood states were those found in dementia paralytica, where there was a progressive anæmia, a progressive increase of polymorphonuclear leucocytes accompanying the advancing course of the disease, and the presence of a leucocytosis accompanying paralytic attacks. The chemical investigations of the urine, gastric contents, and of body metabolism, while still fruitful fields for study, do not warrant routine examinations except in the matter of urine and gastric contents to obtain indications for treatment.

A careful physical examination should include in doubtful cases the examination of the cerebrospinal fluid for the purpose of differentiating between functional or organic diseases. As much depends upon the technique, the method is briefly stated.* With the strictest aseptic precautions the needle is inserted between the fourth and fifth lumbar vertebræ, and three or four centimeters of fluid withdrawn. Alcohol 90 per cent., equal to one-half the total amount of fluid withdrawn, is added drop by drop and well mixed. Centrifugalize one hour at high speed, the tube being closed to prevent evaporation. After pouring off supernatant fluid, the coagulum at the apex of the tube is treated successively with absolute alcohol, alcohol and ether, and ether, and mounted in celloidin. The sections are stained with Unna's polychrome methylene blue or Pappenheim's pyronin methyl green.

Lymphocytes (Plate 1, Fig. A) with No. 4 ocular and $\frac{1}{12}$ oil immersion normally never reach over 50 to 80 in 100 fields, but averaged about 450 in 100 fields in paresis (Plate 1, Fig. C). Endothelial cells (Plate 1, Fig. B) are normally in excess of lymphocytes, but not in paresis. Plasma cells (Plate 1, Fig. C) can be considered

* Cotton and Ayer, *Review of Nervous and Mental Diseases*, March, 1908.

pathognomonic for paresis where they average about 2 per cent. of the total cells present. At least three lumbar punctures are necessary for a final decision. The bacteriological examination of the cerebro-spinal fluid, as well as of the blood, has thus far yielded such varying results in the hands of different observers that a routine examination cannot be recommended for diagnostic purposes.

The most difficult part of the examination is securing the **mental status.** In this matter much depends upon the acuteness of the observer, as the patient often enough cannot be depended upon for coöperation. Unfortunately, we have no scientific standards for determining the mental symptoms, but must depend upon the simplest of psychological tests; namely, the asking of questions.

For convenience and thoroughness of examination it is most important to always have before one an outline of the method of examination. If for purposes of record or otherwise, and particularly in medico-legal cases, it is necessary to write down the observations, it is always best to write in full the question and the answer verbatim as given by the patient. Upon subsequent examinations the same questions should be asked, and the answers compared.

This outline of examination should include inquiry as to (*a*) hallucinations and illusions, (*b*) clouding of consciousness, (*c*) disturbances of attention, (*d*) disturbances of memory, (*e*) disturbances of orientation, (*f*) disturbances of the train of thought, (*g*) disturbances of judgment, (*h*) disturbances of capacity for mental work, (*i*) disturbances of the emotions, (*j*) disturbances of volition and action.

(*a*) **Hallucinations and Illusions:** —

Illusions and hallucinations of hearing, sight, smell, taste, and touch.

Hallucinations are deceptions of the senses in which there are no recognizable external stimuli. Illusions are falsifications of real percepts.

Hallucinations and illusions of hearing and sight are by far the most common, and hence our inquiry is more especially directed to them. In most cases it suffices in eliciting hallucinations of hearing to ask directly of the patient, "Do you hear voices, strange or unnatural voices?" Very often the patient will respond at once that he does, and will proceed to describe them. In case the question is not comprehended, it is well to ask if he hears persons about when he cannot see them, or when he is alone. Some patients, not regarding the false perceptions as a peculiar

sensory experience, will promptly say that they do not hear strange voices. Then he should be asked how well he sleeps at night, if he is disturbed by people talking outside. Another fruitful source of inquiry is in reference to the presence of relatives, acquaintances, or associates whom you know to be absent. Not infrequently the patient will say that his employer is in the house, because he heard him talking only a few moments before, or that the father, who is really many miles away, just told him something. Patients sometimes speak in such a natural way about having received messages from persons whom they know to be at a distance, that one does not suspect its pathological character. Close questioning reveals the fact that they believe these messages come over some novel sort of a wireless telephone or by means of "mental telepathy." Absolute denial of any of these experiences is not necessarily convincing. One sometimes elicits hallucinations only when in search of the basis for delusions expressed by the patient. Then he may inform you that he knows that his life is in danger because he overheard men in the next room plotting his abduction. Sometimes the hallucinations do not assume the form of a voice, but are considered as noises in the ears or "indefinite whispering sounds,"

hissing noises, or sounds made by animals. But there are patients who deny altogether hallucinations who nevertheless suffer from them. In such patients their presence can be established by observing them assume a listening attitude, address remarks to invisible persons, or gesticulate earnestly in a certain direction. On the other hand, one cannot infer the presence of hallucinations merely from the patients' statement that they hear voices; but they should be carefully questioned as to just where the voices emanate from, when and under what circumstances they are heard, etc., because not infrequently what may seem to be real hallucinations are genuine sensations. Patients sometimes refer to the voice of conscience or the voice of the heart, who in reality are not suffering from hallucinations at all. The best proof of the genuineness of hallucinations is always found in the patients' reaction to them; for instance, when they talk to invisible persons, plug their ears with cotton, or gesticulate intently.

Illusions are distinguished from hallucinations by the determination of the presence of some external stimulus at the time the sensation is perceived — such as the ringing of a church bell, which is mistaken for a human voice.

The above methods which indicate how hallucinations and illusions of hearing can be elicited are equally applicable in establishing the presence of hallucinations and illusions of sight, smell, taste, and touch.

(*b*) **Clouding of Consciousness:** —

Unconsciousness is the state in which the transformation of physiological into psychical processes is completely suspended. *Befogged states* (twilight states), a partial clouding of consciousness in which neither external nor internal stimuli can create clear and distinct pictures.

The determination of these states rests upon the person's ability to react to definite stimuli. The test already indicated for use in the neurological examinations, such as the test of the sensations of touch and pain by the use of the camel's-hair brush and the pin, or the test of sight by the use of colors, etc., can be used. One may also employ pictures cut from magazines, and especially pictures made into a medley. Questions as to the character of the environment and objects in the room also give an idea of the clearness of consciousness.

(*c*) **Disturbances of Attention:** —

Blunting of attention, in which perceptions do not arouse corresponding memory images, hence do

not unite with past experience and incite a patient to pursue his impressions further.

Suppression of attention occurs in stuporous states, when the attention cannot be aroused by any stimuli, even prodding with a needle.

Blocking of the attention, in which the patient perceives well enough, but the perception is involuntarily prevented from influencing his thoughts.

Retardation of the attention, in which ideas develop slowly, and thus prevent the perceptions from securing any extensive influence.

Passivity of the attention, in which impressions cannot last because they are displaced by new impressions.

Distractibility of attention, in which accidental external and internal stimuli dominate the attention; hence attention wanders rapidly from one thing to another.

Hyperprosexia, in which the attention is completely absorbed by a single process.

These disturbances can be well elicited by asking the patient to add or subtract figures successively; as the successive subtraction of 7 from 100 or the successive addition of 3, 9, or 13, observing the slowness or rapidity and the halts as well as the interruptions by other stimuli. Or the patient

may be asked to describe a certain well-known event, such as an accident, a visit, etc., noting the rapidity with which the successive events are narrated and how well the patient keeps to the subject. The distractibility can be determined by dropping a penny on the floor or by pulling some striking object out of your pocket, while the patient is narrating this event. Some indication of the patient's attention can also be obtained while he is responding to the tests of sensibility.

(*d*) **Disturbances of Memory**: —

Faulty impressibility of memory, in which the faculty for receiving more or less permanent impressions made by new experience is impaired.

Faulty retentiveness of memory, in which there is an inability to recall accurately former knowledge.

Inaccuracy of memory, in which the relation of past knowledge is distorted under the influence of delusions or otherwise.

Fabrications of memory, where the patient no longer sticks to facts, but depends altogether upon pure invention.

Impressibility of memory can be best determined by giving the patient a series of numbers: as, "8746 — ring 13," and after an interval ask him to recall the number; or you can similarly ask

him to recall such syllables as "ness, con, late, cal," or again you can show him a photograph and in a few moments ask him to select this photograph from a group of photographs. If patients resent such tests, one must depend upon such questions as: What did you have for dinner yesterday? Who were your callers this morning? Where did you go for your morning walk? Who visited you yesterday? etc.

Retentiveness of memory is elicited by questions involving school knowledge in geography, grammar, arithmetic, history, etc. What is the definition of a lake? Capital and boundaries of your states? What is a noun? What Presidents of the United States have been assassinated? When was the Spanish-American War? etc. Furthermore, questions as to place of residence and employment, year of marriage and of birth of children, names of teachers, etc., will test the retentiveness of memory.

Inaccuracy of memory and *fabrications* become evident in the answers to questions bearing upon the past life of the patient and his experiences. A second interview is usually necessary in order to bring out the inaccuracies of memory, especially with those patients who are able to make up a consistent story, but who, at another sitting, give

an altogether different set of facts. Refusal to answer questions should by no means deter one from requesting them to write their answers, which mute catatonic patients will often do.

(*e*) **Disturbances of Orientation** (disorientation): —

Disorientation is a faulty comprehension of the environment in its temporal, spatial, and personal relations.

In determining *time disorientation,* one should ask such questions as: What is the date? The day of the week and month? What is the year? What time of day is it? etc. Inability to answer these questions correctly may be regarded as establishing time disorientation, providing fabrications can be eliminated.

As to *place disorientation* one can ask: What place is this? The city and street? Is this your home or is it a church? etc. Failure to explain the environment correctly means place disorientation.

Person disorientation may be elicited by asking: Who are these persons about you, their names, and what relation do they bear to you? etc.

If the patient refuses to respond, evidently fabricates, or for any reason cannot respond, his disorientation may be determined by watching

his reactions to his environment; for instance, noting whether or not he is able to find his way about, to find the lavatory, the dining room, and his bed, to recognize his relatives, whether or not he complains that the daily paper is old, or calls associates by unfamiliar names.

Disorientation may arise from apathy (*apathetic disorientation*), when the patients simply lack the inclination to understand the meaning of what they see and hear; or it may be due mostly to faulty memory (*amnesic disorientation*). Disordered apprehension may give rise to a form of disorientation which is called *perplexity;* this with hallucinations and delusions produces the disorientation encountered in delirious states. Still another type of disorientation to be differentiated is the *delusional disorientation*, which develops from faulty mental elaboration of impressions, producing delusional ideas as to time, place, and persons; for instance, the patient may have the delusional idea that the calendar date is wrong, but at the same time recognizing that other persons follow the usual calendar.

(*f*) **Disturbances of the Train of Thought:** —

Paralysis of thought, in which there is a total lack of associations, hence meagre responses to questions and very little voluntary speech.

Retardation of thought, in which there is a slowness and difficulty in the elaboration of impressions, producing slow response to questions.

Compulsive ideas, which irresistibly force themselves into consciousness, and are usually accompanied by a disagreeable feeling of compulsion.

Simple persistent ideas, which simply persist in the train of thought unaccompanied by feelings of compulsion. This includes *perseveration,* in which the patient uses an indicated object in the same way he has just previously used another.

Circumstantiality, in which the train of thought is interrupted and delayed by the introduction of many non-essential accessory ideas and renders the relation of an incident tedious and long drawn out.

Flight of ideas, in which there is a rapid change of goal ideas, while the successive links of the chain of thought still remain fairly well united.

Desultoriness, in which there is a complete loss of goal ideas, so that ideas follow each other abruptly and disconnectedly.

If the patient is communicative, one has already had a chance in following the answers to questions bearing on the physical examination to determine the presence of disturbances of the train of thought. Questions relative to the memory of the patient should give one an idea of the wealth

or the impoverishment of his store of ideas. If the patient answers in monosyllables, as "Yes," "No," or "I don't know," or simply gives single facts, without entering into a description of incidents asked about, *paralysis of thought* may be suspected. This is more probable if after more than one seance you fail to find anything that interests him and about which he can talk, including his home, his employment, his pleasures, or church or social relations. Paralysis of thought must not be mistaken for *retardation*, in which the patients also have little to say. Persistent inquiry and prodding usually shows that the patient suffering from retardation of thought has plenty of ideas, only it is difficult to drag them out. Furthermore, his speech is not only meagre, but also slow and uttered in low tones. *Compulsive* ideas are usually volunteered by the patient. If not, a simple question as to whether he is troubled by disagreeable ideas, which are constantly recurring and accompanied by uncomfortable feelings, should suffice in eliciting them.

Simple persistent ideas are usually self-evident if the patient is communicative; for instance, the catatonic patient may repeat for hours such persistent ideas as, "I want my wife, I want my wife," etc. Patients may suffer from persistent

ideas without expressing them, then one must ask directly if simple ideas are persistently recurring in their minds.

Perseveration may be discovered in voluntary speech, but is best elicited by asking the patient to name different objects placed before him, such as knife, watch, pencil, etc.

Circumstantiality, flight of ideas, and *desultoriness* very often occur in patients who are voluble, and hence there is little difficulty in determining their presence. If, however, the patient is not voluble, one is often able to discover the defects by asking the patient to relate connectedly the incidents of some recent personal experience, such as a detailed account of his daily routine or of his journey to the hospital, etc. Prodding the patient during the narrative by interjecting, "Yes, yes," or "Is that so?" often serves to keep up the stream of thought. A very important method in determining the train of thought is to examine the voluntary writings of the patients, their letters to friends and relatives, their written requests, etc.

There are more accurate tests for determining the association of ideas, some of which are of clinical value. Give the patient a noun, such as "man," and ask him to speak aloud the ideas that

first arise in his mind. Or you may request the patient himself to jot down in order all of the ideas arising in his mind after the initial word has been given. This test enables one to determine the relationship between the inner and external associations, — the prevalence of fixed associations, sound associations, also the tenacious holding of single ideas, the tendency to sudden halting — and finally the wealth of the store of ideas.

Many patients will not lend themselves to such tests, and then one must depend upon their voluntary productions and answers to questions. Furthermore, there are patients who refuse to answer questions, but are nevertheless voluble. In such cases, it is necessary to follow carefully the content of thought, employing if necessary a stenographer, because such voluntary speech may furnish the necessary clew as to the form of mental disease from which they are suffering.

In describing the disturbances of the train of thought it is well to employ the term "confusion," a term to be used only in connection with the disorder of thought; such as "*confusion with flight of ideas*" or "*desultory confusion.*"

(*g*) **Disturbances of Judgment:** —

Delusions — morbidly falsified beliefs which cannot be corrected by argument or experience.

Systematized and unsystematized delusions. Systematized delusions centre about some one or more definite objects, *i.e.* become a part of a system.

Delusions of self-aggrandizement include expansive delusions, delusions of grandeur, and delusions of health.

Expansive delusions, in which the patient believes himself possessed of wealth, of great power, of influence, or of unusual qualifications.

Delusions of grandeur are expansive delusions of an extreme degree.

Delusions of self-depreciation include delusions of persecution, of self-accusation, of misfortune, of jealousy, also nihilistic and somatic delusions and many others.

Delusions of persecution, in which the patient believes that he is subjected to various forms of persecution.

Delusions of self-accusation, in which the patient believes that he has committed sin and is unworthy.

Delusions of misfortune, in which the patient believes that misfortune has befallen him.

Delusions of jealousy, in which the patient distrusts the fidelity of relatives and friends.

Nihilistic delusions, in which the patient believes that things are non-existent.

Somatic delusions, in which the patient's absurd beliefs refer in some way to his body or its organs.

If the delusions held by the patients are at all prominent, one would undoubtedly have encountered some of them by the time this stage of the examination had been reached, or there would have been at least some hint, which would serve as a basis for further inquiry. In eliciting delusions, direct questions are less pernicious than in searching for some of the other symptoms. Hence, one may ask directly: Are you persecuted in any way? Have you enemies? Do you possess much wealth? Are you troubled? Are you grieving over something you have done? Is there anything the matter with your body? your heart? lungs? stomach? etc. Are you disturbed by peculiar influences? etc.

In case such questions fail to elicit delusions, and the patients show reserve and tend to answer briefly and abruptly, or refuse altogether to speak of personal matters, one must be tactful in uncovering delusional ideas. Sometimes if the patients are disturbed because of the restraint of liberty or because they must submit to nursing and medical attention, one can disclose delusions by simply asking why they have been deprived of their liberty, or are under the care of a physician. More often it is necessary to introduce some subject of

personal interest, such as their employment, their travels, favorite literature or recreation. Following up closely the personal element in the conversation, some hint as to delusional ideas is apt to be inadvertently dropped. Again one may ask such questions as: What is your idea of trusts? Have you ever been a member of a trade union, and has it benefited you? Where have you travelled, and what countries did you most enjoy? A full discussion of matters of mutual interest, particularly matters that concern the patient's livelihood, very often disclose delusions that cannot be otherwise elicited. Among women, domestic cares, church and social relations, and especially neighborhood differences are fruitful sources for discussion.

Somatic delusions may be elicited by such questions as: Are you in good health? Is there anything the matter with your heart, lungs, stomach, limbs, sexual organs, or head? Do you sleep well? or, Do you enjoy your food?

After one has elicited the various delusions, evidence as to systematization of the delusions can usually be established by asking: What is the purpose of all this, and what is to be the outcome? Do these various experiences have anything to do with each other?

In some cases even exhaustive questioning and

close observation for days and weeks may fail to disclose delusions of any type. In such instances it is necessary to resort to a patient scrutiny of all the individual's acts and writings. If delusions are really present, it is usually only a matter of time before the conversation or conduct will reveal them. Sometimes the disclosure comes through such simple acts as the fact that the patient is observed to wear several thicknesses of paper in his shoes, or to make use of an unusual color of ink in writing, or wears a certain style of cap. Inquiry as to the reason for such conduct may open up a whole host of delusions.

Impaired judgment in matters other than the delusion can usually be determined during the discussion of such subjects as are suggested in the preceding paragraphs, and by such questions as: How do you explain your confinement and the restriction of your liberty? Is it just? Are you able to support your family? Do others aid you as much as they should in providing for the home? To what trade unions, social orders, or business associations do you belong, and how do you benefit by them? etc.

(*h*) **Disturbances of Capacity for Mental Work:—**
Increased susceptibility to fatigue.
Impaired recovery by relaxation and sleep.

Faulty application due to distractibility.

These disturbances can be determined both by inquiry and by observation. The patient can be tested by such tasks as writing letters or to dictation, or by the performance of some simple duty. The tests suggested for determining the association of ideas will also give one a hint as to the capacity for mental application. As for the recovery from fatigue by relaxation and sleep, one must depend upon the patient's own statement and observation of his reaction to sleep and relaxation. Distractibility is easily determined by watching him as he passes abruptly from one unfinished undertaking to another.

(*i*) **Disturbances of the Emotions:** —

Emotional deterioration (emotional indifference or apathy), in which the patient fails to show a normal amount of interest.

Increased emotional irritability (changeable mood), in which the feelings of the patient are intensified and hence give rise to rapid changes of mood.

Morbid emotions, in which the patient presents either morbid fear, morbid dejection (melancholy), or morbid pleasure (wanton happiness, feeling of well-being, ecstasy).

Disturbances of the feeling of nausea, hunger,

pain, shame, and of *sexual feelings,* in which the patient presents either an increase, a diminution, or a perversion of some of these feelings.

In determining the disturbances of the feelings,*

* The recent work of Jung and Peterson, published in *Brain,* 1907, suggests a new and probably reliable method of determining disturbances of the feelings. They make use of a mirror galvanometer of Duprez-d'Arsonval made by Carpentier of Paris (Model A, suspension thread 0.08 mm., duration of simple oscillation 1.69 seconds, resistance 6.2 ohms). The reflected light may be thrown either upon the screen by means of an arc light or for more accurate work upon a millimeter scale. The test person is put in the circuit with the galvanometer and one dry cell and a shunt is also employed to regulate the amount of current. The electrodes are nickel-plated copper upon which the hands or feet may rest. When the test person is placed in the circuit, and every possible stimulus avoided, one obtains a rest curve characterized first by a considerable deflection and then a slow recession of the curve to almost nothing. When any stimulus is applied, sensory or psychic, such as a shrill whistle or a remark calculated to arouse fear, anger, or pleasure, there appears, after a latent period of two to five seconds, a rise in the curve and then a gradual fall to the previous level. An emotional deterioration is shown by the absence of or very slight deviation of the curve. The tests may include association tests with words. Lifting or moving the fingers or hands causes the light to recede. Strong pressure may cause the light to advance, but such muscular movements are readily detected and do not complicate or interfere with the curves due to the emotions. Also, deep inspiration or expiration or coughing will cause a deflection, but all these influences are readily distinguishable by practice.

one is forced to depend more upon observation of the patients' reaction to their environment and their conduct than upon inquiry as to how they feel, because the replies to such questions are apt to be inaccurate and falsified. For instance, most patients, if asked if they love their parents, would reply, "Yes," in spite of the fact that they never give evidence of feeling when visited by parents and may not even appear to recognize them. Observation of the patients' reactions toward their relatives, their work, and in their social environment is far more reliable than what the patients may say as to their feelings. Yet in determining apathy, one should also question the patients as to their interest in matters that are known to have formerly interested them. Unusual and excessive emotional reaction to the environment or rapid change of mood for trifling reasons may ordinarily be regarded as evidence of *increased emotional irritability*. In making inquiry of the relatives and friends as to the patient's reaction, one should ask such questions as: Has there been a change of disposition, and how has it been shown? Has he become quiet, solitary, timid, despondent, irritable, suspicious, egotistical? Have his feelings changed toward his family or his friends? Has he lost interest in his employment or profession, in

the church, social or fraternal orders? Has he become negligent of his family or his business obligations? Has he become insensible to the feelings or interests of others, or does his conduct show unnatural fear, sadness, or exaltation?

The *morbid emotions, i.e.* dejection, fear, elation, feeling of well-being and ecstasy, usually become quite evident during a prolonged examination and do not necessitate special inquiry, beyond asking the patients, How do you feel?

As to the *general feelings*, the absence of the feeling of pain, of nausea, of shame, etc., again you must usually rely upon the observation of the patient and his general conduct, except in the matter of the sexual life, which the patient may be able to control while under observation.

There are no very accurate means of measuring the emotions except the psycho-physical galvanometer test of Jung and Peterson (see p. 91). Feelings of displeasure, of pain, fear, and anger can be created experimentally in various ways and by hypnosis. Furthermore, the writing scale and the ergograph, which are used to measure the finer expressions of the will, are serviceable in measuring the outward expressions of emotional excitement.

(*j*) **Disturbances of Volition and Action:** —

Paralysis of the will, in which the patient presents a morbid lack of energy (anergy).

Motor excitement (pressure of activity), in which there is a "marked disproportion between the intensity of the excitation and the importance of the motive."

Psychomotor retardation (stupor), in which every movement requires a special exertion of the will, rendering all acts slow in their execution.

Blocking of the will (rigid muscular tension), in which acts are properly and quickly begun but are almost immediately overwhelmed by opposing impulses, so that the patient maintains uncomfortable positions for hours, shows muscular tension, and does not shrink when threatened and pricked with a pin.

Hypersuggestibility of the will (catalepsy, flexibilitas cerea, echopraxia, echolalia), in which the control of the will is lacking so that patients become a prey to every accidental influence: the limbs remain in whatever position they are placed (catalepsy), or can be moulded like wax (flexibilitas cerea), or acts seen are imitated (echopraxia), or speech of others is laboriously repeated (echolalia).

Distractibility of the will, in which there is a morbidly easy translation of ideas into action, so

that acts are only half completed before new ones are begun.

Interference, in which the carrying out of an impulse is interfered with by the interpolation of incongruous impulses, so that acts of the patient are inappropriate.

Stereotypy, in which acts once begun are repeated indefinitely.

Mannerisms, in which acts are peculiarly modified, so that the patient assumes a peculiar manner of walking, talking, or moving, etc.

Negativism, in which there is an impulsive resistance to every outer influence of the will, so that the patient does just the opposite of that which one would expect normally, *i.e.* refuses to answer questions (mutism), closes his eyes tightly when asked to open them, etc.

The determination of these disturbances of volition depends chiefly upon the observation of the conduct. One cannot rely altogether upon the spontaneous activity, but should also observe conduct in reaction to command and suggestion. Thus, *anergy* can be determined not only by watching the patient's voluntary movements, but also his reaction to a request to perform some simple duty or his response to the dinner call. Also, pressure of activity and retardation can usually

be observed without difficulty. On the one hand, the patient can hardly restrain himself during the examination, but must be talking or "on the move" constantly; while the retarded patient has to be prodded in order to get him to move or to speak, and such simple requests as to write the name and address are done very slowly and after much apparent deliberation. In eliciting retardation, it is also well to request the patient to count from one to thirty as rapidly as he can, or to subtract seven from one hundred successively.

Blocking of the will, *interference*, and *mannerisms* are usually apparent in the spontaneous activity of the patient, but it may be necessary to request the patient to shake hands with you, to walk about the room, or to pick up a book and open it to a certain page, or other such acts in order to bring out these peculiar defects. The patient with blocking of the will will start to shake hands or to pick up something and then suddenly cease, and maintain a rigid attitude, while the patient with interference will add all sorts of frills to his movements before the act is accomplished, such as to turn around or twist his hand into an awkward position. The manneristic patient will grasp your hand peculiarly, stand on one foot, or perform the act in some peculiar manner. A favorite method of de-

termining the presence of muscular tension is to approach the patient with a needle and threaten to pierce his eyelid or ear or to prick his finger. At such time he may start to withdraw, but almost immediately submits stolidly to whatever you do.

As regards *catalepsy* and *flexibilitas cerea*, one is quite certain to elicit these defects during the physical examination, when, for instance, a limb raised to a certain position is found to remain there indefinitely or where one encounters a uniform wax-like resistance to all passive movements. In case these disorders are not apparent, one has simply to grasp some portion of the body and place it in an awkward or uncomfortable position.

Distractibility of the will is very apt to be accompanied by pressure of activity where there is plenty of voluntary movement, hence in determining distractibility it is necessary only to watch the patient and observe whether or not his acts are completed before new ones are undertaken. Or you may request the patient to perform certain acts, as to write his name and address or to fetch a certain book from the table.

The same holds true of *stereotypy*, which is usually so self-evident in the spontaneous activity of the patient as not to need special tests. If it hap-

pens not to be apparent, then request the patient to perform certain acts similar to those noted above. In eliciting *negativism*, one has to depend mostly upon attempts at passive movements, but also upon the absence of a natural response to requests. The tests employed for detecting catalepsy and flexibilitas cerea also demonstrate negativism. The arm of the patient when grasped, even very lightly, resists movement in any direction. If one attempts to lift the arm, it is forced further downward, while an attempt to force it downward is met by an effort to raise it. One's hand pressed against the forehead meets active resistance, so that if suddenly removed the head bobs forward, and if the hand is placed against the back of the head, a similar resistance is met.

Inquiry as to conduct of the patient as observed by others, particularly as regards these disorders of volition, is quite as important as the personal examination, as the intensity of these defects varies and hence may not be as evident at the time of the examination as at others. Indeed, patients are less apt to exhibit them when they believe themselves observed. Such inquiry from nurses and parents will prevent your overlooking many important conditions, particularly such negativistic tendencies as eating only the food of others,

getting into others' beds, etc., also the assuming of constrained and awkward attitudes.

In the finer analysis of disturbances of volition, particularly psychomotor excitement, retardation, and tension, Kraepelin suggests the writing scale, by which one can determine the path of the writing, the rapidity, and the pressure. Also the ergograph, invented by Mosso, can be employed to measure the strength of the movement, the effect of retardation, fatigue, and muscular tension, as well as the rapidity with which the contraction and relaxation of the muscles follow under the influence of the impulses of the will. Both of these instruments, however, have their drawbacks, which render their routine application unsatisfactory. The more severe disturbances in the release of the volitional impulses can be measured by the use of the watch, such as in counting as rapidly as possible from one to thirty, rapidly repeating the alphabet, or in simply raising the arm.

The importance of more than one examination of the patient cannot be overestimated. The character of the examination, in which there is so little that is objective and so much that depends upon the response of the patient, renders the liability of error much greater than in the ordinary neurological examination. One should be able to make

at least three mental statuses before being called upon for an opinion. This gives an opportunity to check up the accuracy of the patient's memory of his personal history, to compare the spontaneous speech productions, to elicit full details as to delusions, and to determine if the delusions are changeable, if they continue to involve the environment, and are constantly being enlarged, or systematized. Furthermore, one's first introduction to a patient does not always conduce to such perfect ease, freedom, and confidence as to make possible a full and satisfactory status. Finally there are some patients who are so adroitly secretive that several examinations are necessary before one uncovers the real mental status.

Records of the subsequent examinations should be as full and complete as of the first.

CHAPTER II

The common forms of insanity encountered most often by the practitioner are: (1) dementia præcox, which comprises three groups of cases: (*a*) the hebephrenic, (*b*) catatonic, and (*c*) paranoid; (2) dementia paralytica (paresis); (3) melancholia; (4) manic-depressive insanity, comprising the (*a*) manic and (*b*) depressive phases; (5) paranoia; (6) acute alcoholic hallucinosis and (7) acute confusional insanity (amentia).* In this chapter specimen cases of these several forms of mental disease are so detailed as to give an idea of the important mental symptoms in each and the method of making and recording the mental status.

1. Dementia Præcox

(a) *Hebephrenic Form*

Family History. — The paternal grandmother was insane and the maternal grandmother, as well as two maternal aunts suffered from Huntington's

* For a full description of these and other forms of insanity, see *Clinical Psychiatry*, Macmillan, 1907.

chorea. The mother has always been a frail woman of nervous temperament.

Personal History. — From childhood patient has always been "delicate and extremely nervous." The establishment of menstruation was difficult and for many months the "periods were accompanied by fainting spells." She was of a sociable disposition, but chose companions much older than herself, and in other ways seemed mature for her years.

Psychosis. — Onset gradual. At the expiration of freshman year at college she was found to be unusually nervous, irritable, and "frequently lost control of herself." She quite recovered her mental health by fall and was able to reënter college, but by the end of the second month she began to complain of difficulty in trying to study and "of blank feelings" in her head. Her work suffered materially; there were days when she would make brilliant recitations and others when she would be stupidly dull.

Physically, she was suffering greatly from insomnia and was steadily losing in weight. Very soon after removal from college she underwent a complete change of disposition. Naturally of a mild, amiable, and conscientious temperament, she now became self-assertive, egotistical, deceitful, vulgar, and quarrelsome. Aural hallucinations

also developed almost immediately, and she claimed that strange voices directed her thoughts and told her what to do. She expressed indefinite expansive delusions, such as that she would give birth to the second Christ, and that she was a wolf, and in accord with such ideas would snarl and growl like a wolf, at the same time attacking her mother. She did not lose her orientation and was conscious of where she was and those about her. Her memory, however, seemed to fail, as she was unable to keep track of passing events. She was extremely irritable and lost all interest in her personal appearance and college work. At times she would be momentarily happy and amiable, but this would quickly give way to surliness and irritability. Her conduct was mostly in accord with her many hallucinations and delusions and her varying moods. She was careless of her personal appearance and untidy about her person.

During the succeeding nine months the patient was kept at home and with difficulty cared for by her mother. She continued to express hallucinations of hearing and many incoherent delusions and was less and less able to care for herself. She had continued to lose in weight and the menses had not appeared for six months. Her appetite, also, was poor.

At this time she was first examined, the status præsens showing: —

Perception. — Many auditory hallucinations are expressed: "God talks to me and tells me what to do." "These people here say vile and vulgar things about me." "Spirits also talk to me," etc. In reaction to these hallucinations patient is often seen in conversation with invisible persons. Other hallucinations and also illusions are not elicited.

Consciousness is unclouded.

Apprehension is quite clear and external impressions are correctly apprehended.

Attention is faulty. During conversation there is evident blunting of attention. When questioned she usually answers in monosyllables. Even questions about college life fail to hold the attention. When requested to subtract seven from one hundred successively, she starts rapidly but ceases altogether upon reaching seventy-nine, begins to look about the room and says nothing further. Absorbing interest in things has disappeared and she says but little.

Memory. — The impressibility of memory is considerably impaired, as patient cannot give correctly the date of leaving college, the names of her college professors, the duration of her hospital residence, who accompanied her to the hospital,

etc. Shown one of a series of photographs and later asked to identify it among others, utterly fails. The retentiveness of memory is also somewhat impaired, as shown in her inability sometimes to recall school knowledge, such as adding and subtracting. In this matter there is some variation because at times she is overheard conjugating to herself German verbs, which she cannot conjugate when quizzed.

Orientation is impaired. There is partial time disorientation: the day of the week is Thursday (Monday), the day of the month is November thirtieth (November twenty-third), while the year is given correctly. As to place, she knows the city and at times gives correctly the name of the institution, while at others she calls it a mansion; and as to persons, she refers to those about her as girls, but cannot say why they are here.

Train of Thought. — There is evident desultoriness of thought, as may be seen from the following productions: What is your name? "You people have the lock and key. Must be that I am at home. Are you still writing (sees physician writing) or dictating? Oh, dear! that spoils the seasons. Certainly I am L—— B——." At times, during the interview, questions may be answered quickly, coherently, and to the point; but the

above is a fair sample of her train of thought. There is also evident paresis of thought, as prolonged questioning discloses only a limited store of ideas.

Judgment. — She expresses a few illy defined expansive delusions, such as that she is pretty, accomplished, and witty, and that she may sometime give birth to a second Christ, etc. She has no insight into her condition.

Capacity for mental work of any kind has entirely disappeared. She may occasionally pick up a book or paper, only to look at a picture and again lay it down. College text-books placed before her never create any interest.

Emotionally, the patient exhibits most prominently emotional deterioration, seen in her general apathy and indifference not only to occurrences in her environment but as well to the visits of her mother. She never speaks of college work or of her future. At times she gives some evidence of transitory elation when she laughs and sings or dances about for a few moments at a time. Irritability is also exhibited by her sudden surliness and refusal to speak or obey.

Volitionally, there is some evident paralysis of will, shown by her lack of voluntary activity. She tends to remain alone and unoccupied most

of the time, usually sitting in one place, looking stupidly at the floor, or gazing about indifferently.

Conduct. — In addition to facts already stated, patient has almost no care of her person. Silly and purposeless laughter is very prominent. Suddenly and without evident cause she bursts out into loud and unrestrained laughter, and just as quickly ceases. Often, also, she is seen smiling to herself even during conversation and is never able to assign a reason for it.

Three other mental statuses revealed nothing beyond the observation of an increased tendency to mannerisms, such as standing and walking on her toes.

Hence the diagnosis of dementia præcox, hebephrenic form, characterized by gradual development of increasing dementia, observed in the paralysis of thought, emotional deterioration, and loss of voluntary activity, aural hallucinations, and indefinite expansive delusions.

(b) *Catatonic Form*

Family History. — "Mother once insane and recovered."

Personal History. — Patient has always been a "nervous child," especially so since the death of

her father at twelve years. Menstruation established early; menses irregular and prolonged.

Psychosis. — Onset rather sudden at fifteen years of age. Immediately following the funeral of a beloved aunt she became "hysterical," "laughed and cried beyond control" for several hours, and then became profoundly despondent. She remained alone and cried much, claimed that she had lost all friends, and wanted to die. She asked frequently to visit the priest, because she felt that she had committed sin, but knew not what. Auditory hallucinations were occasionally noticed. Among other things she heard her father's voice announcing that she would die. Consciousness remained clear, attention good, memory unimpaired, orientation good, and train of thought undisturbed. Although greatly depressed, there was no evident retardation, as she spoke both rapidly and clearly.

Physically, she lost in weight rapidly, slept very poorly, took sparingly of food, and was constipated. She did not suffer from any attacks.

This despondency lasted two weeks, when she suddenly became greatly excited. The emotional depression was replaced by elation, and the quietness and seclusiveness by pressure of activity and boisterous, noisy behavior.

Hallucinations of hearing continued, but were altogether of a religious and pleasing nature: God commended her and told her that she was blessed, friends at a distance sent pleasing messages, etc.

Consciousness remains clear and *apprehension* of external impressions unimpaired.

Attention is somewhat distractible, and her voluble speech consists mostly of comments upon what she sees and hears.

Memory. — Impressibility of memory is impaired, as patient cannot recall accurately events since the onset of her illness, or what is transpiring about her, and is quite unable to repeat groups of numbers or senseless syllables which are given to her to remember. On the other hand, remote events are accurately recalled, when her attention can be held long enough to elicit them.

Orientation is good in all respects.

Train of Thought. — The patient is very voluble. The content of her thought shows some incoherence in the form of simple persistent ideas and verbigeration, *i.e.* the same meaningless words and sentences were repeated over and over, such as "let him come," "let him come," and "Hello," "Hello." Again at times she also shows echolalia, when she will repeat over and over what she hears; for instance, when addressed, "Come now, get up for

breakfast," she will repeat, "Come now, get up for breakfast," etc.

Judgment. — She expresses a few changeable expansive delusions of a religious nature, such as: "I am the Virgin Mary." "I am so powerful, I can make you do what I want," etc. She has no insight into her condition and insists that she is perfectly well and capable of work.

Capacity for mental work is completely destroyed by her pressure of activity, hypersuggestibility, and distractibility.

Emotionally, she presents constant morbid elation and happiness, and is always smiling and laughing, and often bursts out into unrestrained laughter.

Volitionally, she presents a pressure of activity which is characterized by identical movements frequently repeated, usually taking place within a narrow range; for instance, she will force her feet up and down in bed for hours at a time, or tap with her fingers on the same spot on the wall or bedstead, or pull vigorously at the lobe of one ear. The movements are usually quite senseless.

In addition, hypersuggestibility of the will is present, as shown by her echolalia and echopraxia, *i.e.* she frequently imitates by word and action what she hears and sees, repeats what the physician says and imitates his movements.

Conduct. — She is untidy and filthy. She smears her food and excrement, disrobes and exposes her person. Occasionally, she attacks those about her impulsively.

Physically, the nutrition is faulty and weight has continued to fall. There is very little sleep, and constipation continues. There have been no attacks. In addition to the exaggerated tendon reflexes, dermatographia is present.

After ten days of this *catatonic excitement* the patient one morning was found in a condition of *catatonic stupor*. She lay outstretched in bed. She would not respond to questions or commands, and refused nourishment. The mental status taken at that time was as follows: —

Perception could not be determined because of patient's mutism. Her conduct, however, did not indicate the presence of hallucinations or illusions.

Consciousness and *apprehension* also could not be determined.

Attention. — Patient's attention could not be attracted. Her gaze appeared fixed on something in the distance and could not be diverted by any sort of stimulus.

Memory likewise could not be determined because of patient's mutism.

Orientation and *judgment*, also, could not be elicited.

The capacity for mental work was completely destroyed by the stuporous state.

Emotionally, although the patient said nothing, her countenance at times seemed to indicate happiness and ecstasy, while at others it was wholly impassive.

Volitionally, she exhibited negativism (see Fig. 27), as shown by her refusal to speak (mutism) and eat. She resisted every attention; when food was placed at her lips, she pressed them tightly together; when an effort was made to open her mouth, the teeth were set; and when one attempted to move her in bed, the entire body stiffened out rigidly; likewise, when the head was raised, the muscles at the back of the neck tended to force the head backward into the pillow. At other times, hypersuggestibility was present in connection with negativism. Though she was still mute and refused food, the limbs could be placed in any desired position, where they would remain for some time (catalepsy). Less frequently the limbs presented a waxlike resistance and could be moulded into different positions (flexibilitas cerea). (See Fig. 28.)

In *conduct*, in addition to what is already indicated, she was wholly incapable of caring for herself. She lay quietly in bed, never making a

voluntary movement except as shown by her negativism in reaction to certain stimuli. At times even the act of micturition was resisted until the bladder became greatly distended, necessitating catheterization. For the same reason it was at times necessary to give enemata.

Physically, no further change had occurred.

Although it was impossible at that time to judge the condition of perception, consciousness, apprehension, memory, attention, and judgment, it was elicited from the patient after the stupor cleared that she had memory for many of the events during the stupor, that she was in large measure conscious, apprehended external impressions, and was capable of attention. Delusions during this period were denied.

Diagnosis. — Dementia præcox, catatonic form, characterized by preliminary despondency with occasional auditory hallucinations and depressive delusions, sudden development of excitement with auditory hallucinations, clear consciousness, distractibility of attention, simple persistent ideas, verbigeration, echolalia, expansive delusions, emotional elation, pressure of activity and echopraxia, followed suddenly by a condition of stupor with negativism, mutism, catalepsy, and flexibilitas cerea.

(c) *Paranoid Form*

Family History. — One sister is a "trifle queer," otherwise negative.

Personal History. — Patient was always unusually religious and also showed considerable sexual excitability, having been for years subject to frequent nocturnal emissions. Friends regarded him as a hypochondriac.

Psychosis. — Onset was gradual and without evident cause at thirty-six years of age, when patient became mildly despondent, left his employment, and began to complain of hallucinations of hearing: "They keep calling me Jack," etc., also delusions of persecution, such as, "They tried to drive me out of the boarding house and out of the shop." Then sexual delusions developed: he thought that remarks of his associates referred to his sexual organs, and that fellow-boarders who roomed over him carried on illicit relations just to annoy him. Thus he was driven about from place to place for three months, but ultimately returned home because "the persecutions were the same wherever I was." By the fourth month he developed many somatic delusions to the effect that the immoral conduct of others affected his kidneys, that his "wind and heart strings had been

pulled at so that he parted in two and his bladder, stomach, and bowels came out," etc. He became agitated and fearful of personal injury and took so sparingly of food that he lost in weight. This state of agitation lasted three weeks, when he quite suddenly became moderately elated and expressed many expansive religious delusions; namely, that he had died and had been made over into a new man, and had become the husband of the Virgin Mary; that his actions were now directed by God, whose voice with that of the Virgin Mary he heard daily. From this time until the time of the examination in the ninth month, the patient is said to have suffered from constant hallucinations of hearing, which consisted mostly of commands from God and the Virgin Mary. From the onset, he was always thoroughly conscious of his environment and well oriented. His memory to his friends seemed unimpaired. He talked much about his many delusions, but always in a coherent manner. His delusions became altogether expansive, referring exclusively to his transformation into a new being, his supernatural relations with God and the Virgin, his extraordinary powers, etc. He had no insight. He became wholly indifferent as to his own livelihood or the welfare of his sisters and careless of his personal appearance, while

his activities were confined to lounging about home and smoking a pipe.

Status præsens in the ninth month: —

Perception. — Hallucinations of hearing are constantly present. These are mostly of a religious character and consist of conversations with God and the Virgin. "They talk to me about the things I am thinking of," etc. There are also constant hallucinations of touch, concerned mostly with sensations about the sexual organs.

Consciousness is unclouded.

Apprehension, unimpaired, and external impressions are correctly apprehended.

Attention shows only a slight blunting and it requires some prodding to hold it.

Memory. — The impressibility of memory shows some impairment, as patient fails to give correctly many events of his recent life and dates connected with his psychosis. On the other hand, retentiveness of memory is excellent. He can detail correctly all events of his early life.

Orientation is correct as to time, place, and persons.

Train of Thought. — The association of ideas is undisturbed except for some circumstantiality indulged in by the patient during the description of his delusional experiences, and some narrowness

ing the hypogastrium brings out the *hypogastric* reflex. The *cremasteric* reflex consists in a sharp retraction of the testicle when a stroke is made along the inner side of the thigh. The *gluteal* reflex is produced by irritating the skin just above the gluteal fold. The *plantar* reflex is produced by stroking the sole of the foot; the foot is retracted.

The deep reflexes are of greater clinical significance, and every precaution is to be taken to exclude error.

To test the *pupillary* reflex the patient faces a window so that both eyes are equally lighted; the examiner alternately and conjointly exposes and screens the eyes with his hands. "Light action" is shown if the pupils respond by contracting and dilating; "light inaction" when they do not do so. To test the reaction of accommodation the patient is required to fix alternately a near and a distant object — both objects being equally lighted. If the pupils dilate and contract under the influence of the different degrees of convergence, the result is recorded as "far and near action." When far and near action is present with light inaction the condition is known as the Argyll-Robertson pupil.

To exclude confusion of the light test with that

for far and near action, the patient, in a dimly lighted room, may be required to definitely fix some point such as the examiner's nose; a match or a candle is then brought from behind the patient's head to a position in front of the face so that the rays of light may fall upon the pupil. The reflected light from a mirror may also be used. This excludes pupillary accommodation to distance.

To show the *jaw-jerk* the finger is tapped while it depresses the lower jaw during slight muscular tension.

To obtain the *biceps-jerk* the forearm is placed at a slight angle with the arm; a finger, which is laid on the biceps tendon, is tapped. A direct tap on the muscle tendon above the olecranon brings out the *triceps-jerk;* the arm is partly supported by the examiner, the forearm being allowed to hang loosely. To obtain the *supinator-jerk* a direct tap is made on the muscle midway between the elbow and wrist while the forearm is moderately flexed. The *ulnar-jerk* appears by striking the tendon of the extensor carpi ulnaris or the shaft of the ulnar bone where it becomes subcutaneous.

The most important muscular reflex is the *knee-jerk.* The knee to be tested is flexed nearly at a

right angle by being placed over the other knee while the person sits. In this position the quadriceps is gently extended. The patellar tendon is struck over the space above the tibia where it can yield if there is a sudden increase in the tension of the muscle. The quadriceps contracts and the lower leg is jerked forward. If the leg is too stout, the tension in this position may be too great to permit any movement. The examiner may place his arm beneath the patient's thigh just above the knee and rest his hand on the other knee. Positions more favorable to muscular relaxation are sometimes found by letting the leg hang vertically or by resting the foot lightly on the floor. The contraction may be felt by the hand on the quadriceps. There should be no confusion between the recoil and the actual reflex movement. Attention to the leg leads to contraction of many of its muscles, whereby the reflex may be partly or wholly suppressed. Attention is diverted by having the patient hook his hands together and pull hard; the eyes are closed (Jendrassik). The reflex is increased by being freed from opposing muscular contractions; such an increase is termed "reinforcement." It is, in fact, necessary to guard against contraction of the flexors; precautions can be taken by feeling the hamstring ten-

dons; pressure on these often produces relaxation. The blow may be given with the side of the hand, the tips of the fingers, a percussion hammer, or a continental stethoscope with a rubber edge. When the jerk is doubtful the skin should be bared.

The knee-jerk may be aroused by other means of suddenly increasing the muscular tension, especially in condition of great excitability. It may be sufficient to strike a blow on the tibia. Another way to excite the reflex is to jerk the patella downward while the patient is lying down with the muscles relaxed. This test can be made a very sensitive one by holding the patella down with a finger across the upper edge and then tapping this finger so as to suddenly increase the tension; the reflex is obtained even when there is only slightly increased excitability. If the tension is maintained after the tap, repeated rhythmic jerks may be produced while the tension lasts in cases of great excitability of the muscle clonus.

The *Achilles reflex* is aroused by gently pressing the foot up to increase the tension of the calf muscles and then tapping the tendon; the calf muscles contract and slightly extend the foot. The tap may be on the back or the side of the tendon. If the foot is held so that it cannot yield, the contraction may be felt by the hand over the

calf. The blow on the tendon does not cause the reflex directly; it suddenly increases the muscular tension and this arouses the contraction. Instead of a single reflex movement the blow may arouse a clonus (the ankle clonus) if the excitability of the calf muscles is excessive.

To bring out the *front tap* reflex the tibialis anticus is smartly tapped with a hammer or stethoscope while the foot is flexed dorsally by the examiner. The examiner holds the ankle on his knee or puts it on the edge of a stool slightly lower than the chair on which the patient sits; if the patient is in bed, the leg is extended. The foot responds to the tap by plantar flexion.

Babinski's toe-reflex requires some care to exclude complications; the foot should be warm, and the leg should be partly flexed to aid the muscular relaxation and to avoid the occurrence of voluntary movements. The thumb-nail or a match is stroked more or less slowly along the outer sole of the foot. Normally the big toe is flexed plantarward; if it is flexed dorsalward, or if the tendon of the flexor longus proprius is seen to flick up although no actual toe movement follows, the Babinski sign is present. Movements of the other toes — whether coinciding with that of the big toe or not — may be disregarded.

Electrical Examination. — The sponges must be kept moist by a weak solution of salt or baking soda. The indifferent electrode is put over the sternum, the sacrum, or the nape of the neck. The patient must completely relax the muscles. The exciting electrode must be small. Frequently less current passes during the first two or three applications of the shocks; the amount of current should be therefore always controlled by galvanometer readings. The intensity of the current must be the same in both cases, otherwise a polar change cannot be inferred. In the absence of definite polar change *slowness of muscular contraction* indicates slight R. D. in milder stages of nerve degeneration. The less painful isolated induced shock is preferable for children and sensitive individuals. The examiner should in every case first test the current on himself, both for safety and also to minimize the patient's fear of the proposed test. The first test is to be made with the faradic current; if the reaction is normal, the galvanic test is unnecessary. If the response to faradism is diminished or lost, galvanism may be employed for prognosis. The weakest galvanic current which will elicit a response is to be always employed. When the responses to both poles are slightly but equally diminished, the degree of abnormality

can be found by comparing the diseased side with the corresponding parts of the sound one; when the lesion is bilateral, an analogous part of a sound extremity may be used as a standard. When the test is negative to a current so strong that it can be borne without great pain, the response is said to be "lost." For practical purposes it is not necessary to try for the response that might still be gained in such cases under anæsthesia. The motor points of the face, arms, and legs are shown in Fig. 14 to Fig. 19 inclusive.

Different individuals and different parts of the same individual show differing degrees of sensitiveness of the skin. The resistance to the electrical current varies likewise, and the current must be increased when it is greater. The need of the galvanometer is evident. The current actually used should be known. When the patient's sensitiveness to pain prevents the use of this instrument in all measurements, it may be used once to gain information as to the significance of the number of cells that constitute the evidence of the difference between the two sides. In complete reaction of degeneration, percussion should be applied to the muscles to see if mechanical excitability is also present; it shows itself by slow muscular con-

traction in the part struck. The contraction of the muscle is continuous when the faradic current is applied; but if isolated shocks of this current are applied, brief, momentary contractions are caused. When voltaic current of moderate strength is applied, contraction occurs only when the current is changed in strength or when the current is "made" and "broken." In proportion as the nutrition of the nerve fibres is impaired, their excitability is lowered and a stronger current of each kind is required to excite them and cause contraction in the muscles they supply. When there is doubt whether the voltaic current is acting through the nerve endings or on the muscle fibres themselves in neuritis, the slow contraction and its longer duration proves the latter to be the case. Sometimes there is a slight abnormal tetanic contraction during the passage of the current. During the period of increased voltaic irritability the mechanical excitability of the fibres is often increased, and if they are percussed directly, they respond with a distinct, slow contraction.

C. Sensory Examination

Touch. — In testing the sensibility of the extremities one should examine circularly around the

limb to note whether the disorder corresponds to spinal cord segments, which constitute the so-called spinal cord type of anæsthesia, or to the sensory defect of the cerebral type, sleeve- or glove-like anæsthesia, which is best revealed by testing sensation up and down the limb.

Touch is tested by contact. It is change of contact that arouses sensation; prolonged, uniform contact at one place is perceived only by close attention. Beginning contact is more effective than its cessation. The effect of the change depends on its rapidity. A sudden touch is observed no matter how light it is; a firm pressure is scarcely noticed if it is gradually applied. The test for contact should be a pure one, not obscured by sensations of heat or cold. This is a defect in using the finger as a test object; cotton is therefore employed. The patient, with closed eyes, is required to tell when he is touched. Points are touched irregularly over the skin and at irregular times. Sometimes the patient is asked if he feels a touch, when no application has been made; some patients are apt to have such illusions. The contact should not be too gentle. When the skin is thick, light contacts are often not felt even by normal persons. The examiner should try the tests on himself in order to regulate them. The

patient should be required to name the part touched and to localize it with the finger. The term "sensibility to touch" should be used instead of "anæsthesia," as the latter is often inaccurately used. One should always test sensation at the level of the cord lesion as well as that below, and remember that the "level of lesion" may involve either the limbs or trunk, or both. Anæsthetic areas may be found on the trunk when there are none on the limbs (spinal caries).

Simple increase of the sense of touch is really due to a perversion of the sensation of touch. The sensation may be described as "thrilling" or "shocklike." In cases of extreme increase, touch may produce pain, but this symptom should be noted as a stimulation of the oversensitive nerves of common sensibility rather than pain due to a disturbance of the tactile nerves. Touch may cause pain when it is not appreciated as touch. In certain spinal cord diseases one finds impairment of pain and temperature with retained tactile sensibility (syringomyelia). Careful analysis and record should be made of the spontaneous sensations other than pain. Variations in these sensations are often indescribable, but the observer ought to try to elucidate their character without leading the patient.

Another test of touch involves the smallest distance at which two points applied to the skin can be felt as two. At a shorter distance apart they appear as one. Ordinary dividers with dulled points may be used; a more convenient "æsthesiometer" is that of Sieveking, in which the points are attached to a graduated metal bar. The points must be applied to the skin simultaneously and with equal degree of pressure. The examination requires time and patience. Practice gives the patient increased sensitiveness. The defect must be very marked in order to give results that are conclusive. The test is not as valuable as once supposed.

The minimum distances at which two points can be distinguished are as follows: —

Tip of tongue	1.5 min.
Finger tips	2 to 3 min.
Lips	4 to 5 min.
Tip of nose	6 min.
Cheeks and back of fingers	12 min.
Forehead	22 min.
Neck	34 min.
Forearm, lower leg, back of foot	40 min.
Chest	45 min.
Back	60 min.
Upper arm and thigh	75 min.

The distance is smallest at the tip of the tongue — that is, the sensitiveness is greatest.

Different individuals show variations in the relations from those in the table; variations that are proportional all over the body are probably physiological.

Pain. — The nerves of common sensibility carry the sensations of pain. The test is usually made with a blunt pin-point. A needle should not be used; its point is too fine. It may penetrate the skin. Moreover, it may not be felt at all where the nerve endings are not close together in case it happens to strike between them. The test may be made with a fine wire from a faradic battery, but the test must be made with great care and the current must be carefully graduated if accuracy is to be gained over the pin-point method. Simple touch may produce pain if common sensitiveness is greatly increased. Sensations distinctly abnormal, such as thrilling, tingling, etc., may be produced by both tactile and painful impressions.

Sometimes the prick is perceived first as a touch and afterward as a pain (as in tabes). The patient may name only the first one; he should be required to name each as it appears.

The fingers should grasp the pin so as to expose

only a certain portion of the point; in this way the test is kept uniform. Sensitiveness to pain is often diminished but not lost. Frequent comparisons to some standard in another part of the body should be made in order to avoid the source of error just mentioned, and also the errors arising from mistaken and varying notions of the patient as to the degree of pain which he should recognize. The disagreement and unreliability of many examinations are to be largely attributed to those sources of error.

Temperature. — Hot and cold spoons, or a hinged-tongue depressor with one blade heated, or two similar test-tubes with hot and cold water may be used. The degrees of heat and cold must be sufficiently marked to justify us in regarding the patient's doubt as pathological and not as due to lukewarmness of the testing object. To determine the power of differential discrimination large test-tubes containing thermometers are filled with water of known temperatures.

Temperature is usually affected together with sensibility to pain, but not often in the same degree; one may be impaired without the other, as in syringomyelia. This is different from the case with touch, where sensibility to pain may vary though touch is intact. There may be abso-

lute loss to both heat and cold. Slight diminution in the sensitiveness to temperature may pass undetected.

Although in some cases considerable degrees of difference are correctly felt, a quality of difference may be perceived analogous to that noted in the perception of difference of pressure. Hot objects may feel cold, and *vice versa*. Objects of ordinary temperature may arouse sensations of pain, or heat may be less readily perceived than usual. Delay in the perception of temperature is found in the cases where such a delay in the perception of a pin prick occurs. Normally, temperature is less quickly perceived than pain, because time is required to raise the temperature of the skin sufficiently to enable the heat to penetrate its nerves.

The accuracy of the test of the pain sense may be verified in a rough way by a test-tube with water hot enough to produce pain normally.

The examination for each of the two senses, heat and cold, should be kept separate, because the nerves for the two are different; the nerve endings are distributed differently over the skin. One set of spots feels heat, another set, cold.

Figures 20 to 23 inclusive give the sensory areas corresponding to the various segments of the spinal cord.

Muscle Sense. — This includes also *muscle-pain*

sense. To test the sensations from the muscle fibres the belly of the muscle is gripped; the uncomfortable or painful sensations are compared with similar sensations from muscles known as sound. Postural sense is a compound of sensations from the skin, joints, and muscles; it is tested by the parts while at rest or in action. Resistance to contraction is tested as follows: the patient, with closed eyes, tries to detect differences in weight between pairs of objects, such as leather balls the size of golf balls weighted to degrees between two drachms and two pounds. The skin furnishes part of the sensations in this test, but this complication can be diminished by placing the weight in a bag suspended by a string from the part tested; or increase the area of the suspension in order to diffuse the skin impression in a diminished degree over a large area; or increase the weight and therefore the pressure in both area and degree so that the addition to be discovered shall bear only a small proportion to the total. A difference of one-fortieth may be distinguished by the muscle sense; the skin has a much duller sensibility. It is not practical to apply an electrical test to the skin. Application to the muscle is possible only after anæsthetizing the skin by cocaine.

The ability to recognize passive posture is a rough but practical test for muscular sensibility. The patient's eyes are closed. A limb is seized by the examiner and placed in some position. The patient tells the position or places the limb of the other side in the corresponding position, or indicates the direction of the movement with the fingers. If the skin is normally sensitive, the examiner should take care to grasp the limb firmly and press on both sides so that the posture may not be judged by the direction of pressure. The examination should be repeated several times to avoid error.

Outline figures are made specially for charting the data concerning touch, pain, and temperature. See Figs. 24 and 25. This is far better than written descriptions, which are too confusing and obscure for rapid reference.

The astereognostic sense is that which recognizes form. It is tested by applying to the skin or giving in the hand of the patient with closed eyes such objects as keys, coins, etc., and asking him to describe their size, weight, and form.

D. General Functions and Viscera

Aphasia. — This is the term applied to a speech defect that is not articulatory. It must be tested in such a way as to show its exact nature. Motor

singing and at others shouting. The content of her speech shows clearly a flight of ideas, with occasional sound associations and rhymes; for instance, says voluntarily, "Oh, my father, yes, fatherland," which might be "Our Father who art in Heaven." "I don't like that place, I was there at eight o'clock in the morning. Don't say prayers in the morning. The coffee was good, but I did not eat breakfast, last, cast," etc.

Judgment. — It is difficult to judge accurately of her judgment because of her faulty responses. Occasionally, she expresses fragmentary expansive delusions which are evidently soon forgotten, as they are rarely repeated; for instance, "I am the Queen of the May; see my beautiful gown [torn garments]. I have lots of money," etc. She has no insight as to her illness.

Capacity for mental work is completely destroyed by her great distractibility, since one thing is hardly begun before another is undertaken, and this in turn is only half finished before she is distracted to something else.

Emotionally, she exhibits increased emotional irritability, rapid change of mood, and persistent morbid elation. Although she is generally happy and elated, laughs loudly, sings and runs about gleefully, she often shows sudden changes of mood

and upon slight provocation will become passionately angry. At one moment she is pleasant and agreeable, while at the next she stamps her feet, curses, and jumps at one, trying to scratch one's eyes.

Volitionally, there is marked pressure of activity. She is never still except when asleep. If forcibly held, her hands and feet are in constant motion, either in rhythm to a song or beating a tattoo. Her movements are always purposeful and often graceful, but never constrained or stereotyped. She races about the room, leaps up on the window-sill, and then begins to sing a comic song, accompanied by the wildest gestures, suddenly jumps to the floor and begins to dance a clog, and so on; from one thing to another. Her conduct also indicates distractibility.

Conduct. — Besides that already indicated she is filthy, smearing her person and room. She is so busy that she has to be urged to eat. She sleeps barely four hours daily and then only by catch naps. She tears her clothing into strips, makes festoons and decorates her person.

Physically, nutrition is hardly impaired in spite of her great activity. The tendon reflexes are all exaggerated.

Diagnosis. — Manic-depressive insanity; second

attack — manic phase, characterized by pressure of activity, flight of ideas, clouded consciousness, transitory expansive delusions, increased emotional irritability, and frequent changes of mood.

(b) *Depressive Phase**

Family History.— There is no history of hereditary taint.

Personal History.—Quite normal in all respects.

Psychosis. — There is a history of an attack of "nervous prostration" lasting several months at twenty-eight, when patient was sad and could not work. This nervous prostration was not the outcome of overwork or of any known causative factor. (This was undoubtedly her first attack.)

Again at forty-four years, following the death of her father, patient showed profound and unnatural grief and for many months could not be reconciled, and was incapacitated for employment. This probably constituted her second attack.

Present attack — onset gradual at forty-six years of age, the only assigned cause being worry over her inability to pay off a mortgage. She be-

* The first attack in previous case was of the depressive phase, but unobserved.

came profoundly despondent and feared punishment for having done wrong and thought her sisters were against her. Within a few weeks she attempted suicide and from this time was remorseful and feared being arrested and placed among criminals. She also became exceedingly sluggish and would stand and apparently ponder over her work for long periods of time. About the house she walked very slowly and it required a very long time for her to prepare the meals, while in speaking she talked not only very slowly, but in low tones. She never expressed hallucinations, consciousness was clear, and her orientation perfect. Likewise she seemed able to remember everything accurately.

The status præsens at the time of the first examination, which was in the third month, was as follows: —

Perception. — Hallucinations are absolutely denied.

Consciousness is clear and external impressions are correctly apprehended.

Attention. — There is evident retardation of attention, as it requires considerable time for her to fix her attention upon tests.

Memory. — Both the impressibility and the retentiveness of memory are unimpaired. If per-

sisted with, she is able to give a coherent and relevant account of her life, including recent happenings, while all tests are correctly responded to.

Train of Thought. — Retardation of thought is quite marked. Her responses to questions are slow and long drawn out, so that it requires a very long time to elicit a history from her. On the other hand, her responses are coherent and relevant. Her voluntary speech is rather meagre and confined to such mournful expressions as: "I have been banished," "I have put myself in hell," "I would be glad to die." These expressions are repeated over and over, interjected between her replies to questions.

Judgment. — There are expressed voluntarily many delusions of self-accusation. "I have sinned past forgiveness; God will never forgive me," etc. She also expresses a feeling of inadequacy, sometimes associated with disordered bodily sensations: "I feel all used up, I am changed, I can't set my mind to things. My legs feel so different, as if they were not my own. Things don't taste the same. I feel so unnatural all over." Insight is wholly lacking: "I only wish I were insane." In matters other than her delusions, the patient shows good judgment.

Capacity for mental work is greatly impaired by

the extensive retardation, which makes application difficult and almost painful. Furthermore, her despondency and delusional ideas are very distressing.

Emotionally, the patient shows persistent morbid despondency. She is constantly bemoaning her wickedness, and never expresses a feeling of comfort or complacency. Often her countenance betrays fear, and she will admit that she fears her fate.

Volitionally, there is marked retardation, seen in the slowness of her movements, both voluntary and in obedience to command and her low and slow speech. At times, when most distressed, the retardation is less evident in the movements of the arms and trunk, as she will wring her hands and sway her body.

Conduct. — She is tidy and able to care for her bodily needs, though she is somewhat careless of her personal appearance. She either sits or stands gazing about her, often with her hands clasped. She occasionally approaches those near her and bemoans her wickedness. In eating, going to and from meals, dressing and undressing, she is exceedingly slow.

Physically, she is poorly nourished, her skin is somewhat dry and sallow. There is anorexia and

moderate insomnia. The tendon reflexes are somewhat sluggish.

Diagnosis. — Manic-depressive insanity, depressive phase, third attack, characterized by psychomotor retardation, delusions of self-accusation, persistent emotional dejection, feelings of inadequacy and unnaturalness.

5. Paranoia

Family History. — Good.

Personal History. — Educated in common school and at first engaged as a laborer, he ultimately became a skilled mechanic, holding a responsible position. He was a man of excellent habits, with an equable disposition, and enjoyed excellent health until the onset of his psychosis.

Psychosis. — Onset gradual. At forty-three years of age he first began to complain to his wife that things were different at the shop; he could not please the superintendent, fellow-workmen behaved strangely, his tools and furnaces were tampered with, and he could not accomplish good work. He intimated to his employer that he had become jealous of fellow-workmen, and that he believed they were trying to undermine him. This expressed, he finally resigned his position and after a rest of several months, upon the advice of his

physician, took work in another city. In his new environment he seemed less suspicious and troubled for a time; but this improvement was brief, since his former troubles reappeared with even greater force. Again his tools were tampered with and his metal spoiled for casting. The persecution became even more extensive and involved the Masonic Order, members of which had taken up the persecution. At the time of resigning from this factory he believed the church also had a hand in his persecution. He therefore withdrew from both the Masonic Order and the church. The minister was accused because he had sent his letter of membership to the church at his new home, and thus his wife was accused of being a party to his persecution. Hallucinations did not appear until this time, when he claimed that his wife had accomplices in the home, whom he could overhear plotting to get rid of him. In reaction to these hallucinations he became abusive and threatening toward his wife. The assigned purpose of all of the persecution was to get rid of him. For this reason the wife was bringing colleagues to the house nightly, and the church and Masonic Order had banded together to aid her. When seen in public, he appeared pleasant and agreeable and unless the conversation was drawn

into the matter of his persecutions, he would have been considered normal. Even after a duration of two years he conversed well, had a good memory, and was as efficient as ever at his trade. Physically, the patient since and before the onset of the disease had suffered from nephrolithiasis and associated with it pronounced pyuria. A little later his aggressive attitude toward his wife necessitated his confinement. When examined at that time, the status præsens showed: —

Perception. — Occasional auditory hallucinations; he hears his wife and her accomplices in the building plotting further persecution, also patients in the ward speak of men who have been intimate with his wife. He is unable to identify these men, but believes that they must be members of the crowd of persecutors; but his chief annoyance comes from what he calls a "Burillic Ray," which can convey the human voice from fifty to seventy-five miles. Through this Ray he can hear voices of many persons. Hallucinations or illusions of other senses are not present.

Consciousness is unclouded.

Apprehension is undisturbed and patient is able to apprehend correctly external impressions.

Attention is very good.

Memory. — Both the impressibility and the re-

tentiveness of memory are unimpaired. The patient is able to give a full and accurate account of his life up to the present time.

Orientation is perfect in all respects.

Train of Thought. — The association of ideas does not show any impairment, and the patient's responses are always coherent and relevant.

Judgment. — The patient freely expresses many delusions of persecution and of personal injury, also delusions of an expansive nature, all of which are thoroughly systematized. He relates how his persecutors began their work over three years ago, at first being confined to attempts of his fellow-workmen to get him discharged, to which his superintendent later became a party, then upon change into another shop their renewed persecution, aided by the Masonic Order. Later his church friends were involved, and finally his wife became a party to the persecution and had men come to the house for the purpose of making it more disagreeable for him. Then began a new form of persecution by means of mysterious electrical appliances which were played upon him and produced pain in different parts of the body, disturbed his sleep, and impaired his digestion. After two and a half years of this persecution, it was revealed to him by means of

the " Burillic Ray " that he really was an important personage selected as a legatee to a large fortune named in a certain " Rebecca Andrus Will." The purpose of the persecution, therefore, was to get rid of him so that his persecutors might come into possession of the legacy. They therefore employed the Ray machine for sending currents through him, for disabling him with pain, and for reading his thoughts, causing him to suffer great agony. Wherever he went the persecution continued. He was deprived of his liberty and sent to the hospital to prevent his communicating with individuals who could aid him, and since coming to the institution the officers and physicians had established a Ray system of electric wires, controlled from the office, which continue the evil work. So severe was the torture at times that he despaired of his life. Furthermore, in accordance with a condition named in the Andrus will, he had been compelled to marry a daughter of one of the physicians. There are four more years of persecution and then the affair would end and he would receive his liberty and the ninety thousand dollars. In connection with these delusions he also expressed retrospective falsifications of memory, *i.e.* it had now become clear to him in looking back over

his past life that certain actual occurrences which took place years before he was aware of the persecution indicated even then that he had been chosen as a public martyr, but ultimately to receive a large legacy.

There was no insight into his mental condition. His judgment on matters outside of his delusions was good.

Capacity for mental work is interfered with. While patient reads much, writes letters, and cares for his quarters, he is often annoyed by the application of the " Rays " to such an extent that he has to give up and go to bed, complaining bitterly of pains in his abdomen.

Emotionally, the patient shows no striking abnormality. At times he is depressed and angered over his persecution and physical suffering, while at others he is complacent and satisfied to be a public martyr to be honored with liberty and wealth.

Volitionally, there is no disturbance.

Conduct. — The patient is orderly, quiet, neat, and gentlemanly. He occupies much of his time in reading, writing, and conversing with fellow-patients — in fact, there is nothing in his conduct to indicate that he is disturbed.

Physically, he is poorly nourished, suffers from nephrolithiasis and constant pyuria.

Upon subsequent examinations the mental statuses were the same. The delusions were always coherently and definitely expressed, showing a perfect system of persecution with the definite purpose to dispose of him and secure the large legacy which he was to secure as a prize for his long suffering. They ultimately involved the environment to a greater extent and created ever more suspicion toward some of the officials. There were also short periods of a few days when he seemed to undergo more physical suffering and would exhibit greater apprehension for his own safety.

Diagnosis. — Paranoia, characterized by systematized delusions of persecution, of personal injury, and of an expansive nature, with retrospective falsifications of memory, without evident deterioration of memory, thought, emotions, or volitions.

6. Acute Alcoholic Hallucinosis

Family History. — Good.

Personal History. — Development normal. He was a steady, industrious cooper, who from an early age was addicted to the use of alcohol, at first very moderately, but from forty to excess. He drank mostly beer and whiskey, but was

never intoxicated, and always able to work regularly.

Psychosis. — Onset rather sudden at fifty-three years of age. He had been tremulous and a little unsteady for some weeks and had been sleeping and eating poorly. Suddenly one night upon retiring he was aroused by hearing voices in the apartment below. His neighbor Smith said: "Jack has got to move." "Jack has been drinking," etc. These hallucinations of hearing continued several nights and caused him great anxiety. Then at the shop he overheard men say to each other: "Jack has been drinking heavily. He will be discharged," etc. Even Smith's voice was heard recounting to fellow-workmen how heavily he drank at home. Although he continued at work days, his nights became more and more restless. Almost all night he could hear men and women in the rooms below and outside his window talking about him. He heard them threaten to break in and carry him out of town and to tar and feather him. He was called vile names and accused of gross immorality with the neighbor's wife. After enduring one week of such persecution without complaining, he asked for leave of absence and went away on a visit, but aboard the train he could hear Smith

and a gang telling people that he was a drunkard and a criminal, trying to escape from justice. While away he was bothered continuously day and night by these voices, and in addition at night "spirits appeared" and announced that they had come to kill him. He hastened home and went to the police for protection, claiming that Smith and a gang of men were down on him and threatening to kill him; that he could not find out the reason why, except that they believed him a drunkard and immoral. Throughout these two weeks he had remained perfectly conscious and oriented, thought was uninvolved, and memory unimpaired. In reaction to his hallucinations and delusions, he had become fearful and despondent.

It was at this time that the first mental status was made.

Perception. — Almost constant hallucinations of hearing, and occasional hallucinations of sight and touch. The auditory hallucinations consist of the voices of neighbor Smith and his wife and a gang of men, who slander and threaten him, say they will see that he is put out of the way, etc. The hallucinations of touch are: "I feel something prick my ankles. I feel electricity in my arms when tying on my shoes. I have

felt and seen electricity go off the ends of my fingers." The hallucinations of sight consist of seeing small human figures dressed in fantastic costumes and again flashes of light, etc.

Consciousness is clear and *apprehension* undisturbed.

Attention is not disordered.

Memory is wholly unimpaired, and patient is able to give an accurate account of his early life and of his psychosis.

Orientation is perfect and he is able to state accurately the time, place, and persons of his environment.

Train of thought is not disordered at all.

Judgment. — Patient expresses fixed unsystematized delusions of persecution which seem dependent upon his hallucinations; the neighbors Smith are persecuting him and want him killed. His shopmates have driven him from the shop and the city and are determined that he shall be imprisoned or killed. They have contrived some way of putting electricity on him and of making him dizzy-headed. The Smiths also administer laudanum, which makes him drowsy, and put stuff in his food. He knows of no reason for this persecution except that they regard him immoral and a drunkard.

Capacity for mental work is disturbed by his hallucinations and delusions.

Emotionally, patient shows persistent morbid fear and despondency, which is in accord with his hallucinations.

Volitionally, there is no disorder.

Conduct. — Patient is orderly, neat, and tidy. He works for short periods when requested to, but remains alone most of the time. He complains bitterly of his persecution and asks for protection and relief.

Physically, he has lost in weight, eats sparingly, and sleep is much disturbed. There is a pronounced fine tremor of the hand, tongue, and lips. The tendon reflexes are considerably exaggerated.

Diagnosis. — Acute alcoholic hallucinosis, characterized by the acute development of hallucinations of sight, hearing, and touch, and associated with the hallucinations, delusions of persecution, and emotional despondency and fear, the consciousness remaining clear, and the memory, attention, and train of thought unimpaired.

7. Acute Confusional Insanity (Amentia)

Family History. — Good.

Personal History. — A small woman of nervous temperament who has always suffered from

dysmenorrhœa. She was divorced at thirty-five after an unhappy and arduous married life, and then, in spite of ill health, had to support herself and child.

Psychosis. — For six months preceding the mental breakdown, she had suffered greatly from endometritis and metrorrhagia and during the last three months had become markedly anæmic and was confined in bed. The onset of the psychosis was sudden during preparations for her removal to a general hospital for treatment. She became " delirious," had vivid hallucinations of sight and hearing, saw faces at the window, and the ghosts of her parents, heard her name called out, shouts of fire, ringing of bells, and crying of infants. Almost at once she became completely dazed and lost all conception of where she was; at one time she was " in a church being married " and at the next " at a grand party." Those about her were mistaken and closest friends greeted as strangers. Her attention wandered. She seemed to have no memory of passing events and would forget even that she had only just awakened and had taken her nourishment. She expressed many changeable delusional ideas, both expansive and depressive; claimed to be a goddess, to be wealthy, to have a fine automobile,

and almost in the same breath would say that she had been driven from home and deprived of her children, was in distress, and needed assistance. She was at times happy and at others depressed, and would chat cheerfully or would weep profusely. Again she would express fear, but all of these emotional states would be transitory and change rapidly. The excitement was intense and the pressure of activity marked, and it was with great difficulty that she could be kept in bed. She would attempt to leap out in order to rescue her child whom she heard crying, or to greet an old friend; again in terror she would try to escape. She would sing loudly and again moan piteously. In conduct she was incapable of caring for herself and soiled her person. Food was refused or eaten hurriedly and there was practically no sleep.

She was first seen on the third day, when the mental status was as follows: —

Perception. — There are marked hallucinations of sight, hearing, touch, and taste. Though not always admitted, it is evident from her reaction that they are present. She sees faces about the room, sees and smells suffocating vapor pouring in at the door, sees and talks with her child and parents, and converses with God and the angels. She hears it remarked that an operation has been

performed on her and black hairs have been implanted on her face so that she looks like a wild animal. She can feel these hairs on her face. She says she has given birth to a dog which she can feel beside her in bed. These and many more changing hallucinations are present day and night and are constantly reacted to. There are also illusions of sight and hearing. Objects on the wall are mistaken for moving things and persons, while conversations of others are mistaken for profanity, singing, etc.

Consciousness is partially clouded and some external impressions are not correctly apprehended, as may be judged from the illusions.

Attention is extremely faulty because of the great distractibility. Her attention is attracted first to some moving object in her environment, then to a remark by some one, or to an hallucination or a depressive thought; hence questions asked are rarely answered satisfactorily, and it is wholly impossible to secure any response to tests.

Memory. — Both impressibility and retentiveness are greatly disturbed and she cannot recall either recent or remote events accurately; for instance, she cannot give the age of her child, date of her marriage, and places of residence,

and she has no idea of when she had her last meal, what she has eaten, or who has just visited her.

Orientation is wholly lost and she has no conception of where she is, who those about her are, or the time of day, month, or year.

Train of Thought. — She is extremely voluble, talking or singing most of the time. She presents a flight of ideas and frequent sound associations. She catches up a word from the conversation of the physicians, such as Middletown and begins to remark that it is a city in the centre of the state, but not the capital of Connecticut, but Governor Roberts is a good man who lives in Hartford. Then apparently in response to an hallucination, "Yes, mother, I shall be there; put the potatoes on. Johnnie will soon be home. Johnnie comes marching home again. John Brown's body lies a-mouldering on the green grass growing all around," etc.

Judgment. — She expresses voluntarily many changing delusions of an expansive and a somatic nature: that she is wealthy and will give jewels to all who come to her ball; that there is war, and a massacre has taken place in which all of her people have been killed; also that she has had an operation, her ovaries have been removed and

replaced by dog's ovaries, impregnated with human semen, and that she has given birth to puppies; that she has died and is in heaven surrounded by hosts of angel friends, etc. Individual delusions are rarely held more than a couple of hours at a time, and are constantly giving place to new ones.

Emotionally, she presents an increased emotional irritability with changeable mood. At times she is cheerful and happy and will sing and jest, and again she is sad and cheerless, weeping because all of her relatives and friends have been killed. At times she is even fearful, but despondency prevails.

Volitionally, pressure of activity is pronounced. She sings and pounds the bed, pulls at the bedding, attempts to disrobe and to get out of her room. She will attempt to leap on the window ledge and exhort an imaginary crowd. She will pull the bedding apart, shove the bed about, and stuff the clothing out of the window. She cries aloud for help, attacks her nurses, and throws food away. The movements are not constrained or limited to a small range, but are all over the room.

Conduct. — In addition to what is already indicated, she is untidy and filthy, refuses to take

nourishment, either casting it away or spitting it out of her mouth.

Physically, marked secondary anæmia, endometritis, malnutrition, profound insomnia, and exaggerated tendon reflexes.

Diagnosis. — Amentia, characterized by sudden onset with acute delirium, numerous hallucinations and illusions, clouding of consciousness, complete disorientation, distractibility of attention, impaired memory, flight of ideas, changeable expansive and depressive delusions, changeable mood and pressure of activity.

CHAPTER III

Glossary of Terms commonly used in Psychiatry

A

Acceleration of Thought. — That disturbance of the train of thought in which the association of ideas is rendered more rapid.

Acute Alcoholic Hallucinosis. — A form of acute alcoholic insanity characterized chiefly by the sudden development of coherent delusions of persecution, based mostly upon hallucinations of hearing with barely any clouding of consciousness.

Agitation. — A state of mental excitement which arises from what appears to be a sufficient motive.

Agoraphobia. — A form of compulsive insanity in which there is a morbid fear of being in public places, accompanied by certain nervous manifestations, such as polyuria.

Alcoholic Hallucinatory Dementia. — A form of alcoholic insanity characterized chiefly by hallucinations, self-depreciatory and somatic delusions, some emotional anxiety and irritability, usually

terminating after prolonged course in moderate dementia.

Alcoholic Paresis. — Cases of dementia paralytica in which symptoms of alcoholic insanity supervene.

Alcoholic Pseudoparesis. — Cases of alcoholic hallucinatory dementia in which signs of Korsakow's psychosis also exist.

Amentia. — One of the exhaustion psychoses of relatively short duration in which there is great confusion of thought, clouding of consciousness, hallucinations, and illusions.

Anergy. — See paralysis of the will.

Apprehension. — Act of mind in which one grasps facts of the environment.

Arrested paresis refers to a very small number of reported cases of paresis in which the disease process seems to have been indefinitely arrested.

Arteriosclerotic Insanity. — That form of insanity which arises from arteriosclerosis of cerebral vessels and is characterized chiefly by faulty memory, lack of energy, some despondency, and irritability and certain physical symptoms, as syncope, dizziness, etc.

Ascending Paresis. — That form of dementia paralytica which develops in connection with and subsequent to tabes.

B

Befogged State. — A state of clouded consciousness in which external and internal stimuli do not create clear presentations.

Blocking of the Will. — A catatonic symptom in which acts are properly begun, but are soon interrupted or stopped by an opposing impulse; for instance, the patient starts to open a door, but instead closes it, or begins to shake hands and then stops.

Born Criminals. — One of the psychopathic personalities in which there is an inadequate development of the moral feelings, resulting in conspicuous moral defects from youth up.

Busyness. — A moderate degree of pressure of activity in which the patient is excessively busy in an orderly fashion.

C

Catalepsy. — A form of transient hypersuggestibility in which the limbs of a patient will remain in any position in which they are placed.

Catatonia. — A form of dementia præcox characterized particularly by certain states of stupor and of excitement. (See catatonic stupor and catatonic excitement.)

Catatonic Excitement. — A form of motor excitement characteristic of catatonia in which, in contrast to manic excitement, the movements are purposeless, senseless, and often stereotyped.

Catatonic Stupor. — That form of stupor in which every impulse is almost immediately followed by the release of an opposing impulse, which prevents the consummation of the act and produces blocking of the will.

Chronic Alcoholism. — A form of chronic alcoholic insanity characterized by varying degrees of mental and moral deterioration.

Chronic Mania. — The name sometimes applied to those cases of manic-depressive insanity in which the manic attacks are very long.

Circumstantiality. — A disturbance of the association of ideas in which the train of thought is interrupted by the introduction of many non-essential and accessory ideas.

Clouded Consciousness. — See befogged states.

Collapse Delirium. — A form of exhaustion psychosis of short duration characterized chiefly by dreamy hallucinations, profound clouding of consciousness and confusion of thought, and great psychomotor activity.

Compulsive Acts. — Acts usually accompanied by marked feelings, which seem to be forced upon

one by the will of another, inasmuch as they do not arise from any conscious motive or desire.

Compulsive Fear. — See phobia.

Compulsive Ideas. — Ideas that irresistibly force themselves into consciousness.

Compulsive Insanity. — A form of the insanity of degeneracy in which compulsive ideas and fears predominate and are usually accompanied by certain physical sensations.

Confusion. — A mental state characterized by incoherence of thought.

Confusional Insanity (acute). — See amentia.

Conscious Delirium. — A delirious state, occurring chiefly in epileptic insanity in which the patients appear conscious of where they are and what they are doing.

Constitutional Despondency. — A form of the insanity of degeneracy characterized by feelings of sadness which permeate all of life's experiences.

Constitutional Excitement. — A form of the insanity of degeneracy in which there is a permanent but moderate psychomotor excitement.

Constitutional Mania. — The name sometimes applied to constitutional excitement in which there occur periods of exacerbation similar to the manic phases of manic-depressive insanity.

Constraint.— Strained bodily attitudes exhibited particularly by catatonic patients.

D

Dazedness. — See befogged states.

Dejection. — See depression.

Deliria, Infection. — See infection deliria.

Delirious Mania. — Those extreme manic states in manic-depressive insanity in which there is a pronounced dreamy clouding of consciousness, intense psychomotor activity, great incoherence of speech, marked flight of ideas, numerous hallucinations, and dreamlike delusions.

Delirium. — A state characterized particularly by clouding of consciousness and often by various hallucinations and delusions, increased psychomotor activity, and confusion of thought.

Delirium, Acute. — (Provisionally described as a form of infection psychosis.) A delirious state of short duration and usually fatal outcome, which sometimes accompanies furunculosis, or follows a slight physical illness or may occur in the course of any other type of psychosis.

Delirium, Anxious. — A delirium characterized by terrifying hallucinations and delusions, which occurs particularly in epileptics.

Delirium, Collapse. — See collapse delirium.

Delirium, Conscious. — See conscious delirium.

Delirium, Fever. — See fever delirium.

Delirium, Occupation. — A delirious state occurring most often in senile dementia in which the patient busies himself as if engaged in some definite occupation, as cobbling.

Delirium, Senile. — An acute form of senile dementia characterized by great clouding of consciousness, pronounced hallucinations, and delirious conduct.

Delirium Tremens. — A form of acute alcoholic insanity characterized chiefly by fantastic hallucinations of sight and hearing, some clouding of consciousness, agitation, and fear.

Delusion. — A morbidly falsified belief which is not corrected by argument or experience.

Delusions, Expansive. — All delusions of self-aggrandizement or exaltation.

Delusions, Fantastic. — Delusions that are unusually grotesque.

Delusions, Hypochondriacal. — Delusions in which the patient believes himself afflicted with some grave disease.

Delusions, Nihilistic. — Delusions in which the patient believes that objects are non-existent, sometimes even the patient himself.

Delusions of Infidelity. — Delusions in which

the patient believes friends or relatives are unfaithful.

Delusions of Influence. — Delusions in which the patient believes that he is under certain influences, mental or otherwise, exerted by others, such as hypnotic influences.

Delusions of Mental Soundness. — Delusions in which the patient believes that he is mentally sound, constituting lack of insight into his diseased condition.

Delusions of Persecution. — Delusions in which the patient believes he is persecuted.

Delusions of Reference. — Delusions in which the patient believes that incidents in the environment necessarily refer to himself.

Delusions of Self-accusation. — Delusions in which the patient believes he has committed some grievous fault.

Delusions, Religious. — Those delusions that refer to the religious life of the patient.

Delusions, Sexual. — Delusions involving the sexual life.

Delusions, Systematized. — Delusions which are organized about some central idea or object.

Dementia. — A mental state in which there is grave mental impairment, usually irrecoverable.

Dementia Paralytica (paresis or general paralysis

of the insane). — A fatal form of mental disease in which there develops profound dementia and various paralytic nervous symptoms.

Dementia Paranoides. — A form of dementia præcox, constituting the so-called first group of the paranoid forms in which there is rather rapid deterioration.

Dementia Præcox. — A common form of mental disorder occurring chiefly in the young, characterized by a pronounced tendency to mental deterioration. (See hebephrenia, catatonia, and dementia paranoides.)

Dementia Præcox, Paranoid Forms. — Forms of dementia præcox characterized by persistent hallucinations and delusions.

Depression. — A morbid emotional state characterized by sadness with a feeling of insufficiency.

Desultoriness. — A disorder of the train of thought in which there is a complete loss of goal ideas.

Deterioration. — See dementia.

Dipsomania. — A mental state in which there develops periodically an insatiable craving for liquor.

Disorientation. — A disorder of the intellect in which there is an inability to recognize one's relation to time, place, or persons.

Distractibility of Attention. — That disorder of attention in which it lacks unity and permanence and is dominated by all sorts of accidental external and internal influences.

Dread Neurosis. — A form of psychogenic neurosis in which a feeling of anxious suspense more or less constantly dominates the life of the patient.

E

Echolalia. — A form of transient hypersuggestibility in which the patient mimics what he hears.

Echopraxia. — A form of transient hypersuggestibility in which the patient mimics what he sees done.

Emotional Attitude. — A subjective mental state characterized chiefly by specific feeling tones — the mental attitude toward self or environment.

Emotional Deterioration. — An abnormal lack of feeling or emotional irritability.

Entotic Hallucinations. — See auditory hallucinations.

Epileptic Befogged States. — States of clouded consciousness occurring in epileptic insanity.

Epileptic Furor. — That form of epileptic insanity in which there are morbid impulses to violence.

Epileptic Insanity. — Those forms of mental disorder that accompany epilepsy.

Epileptic Stupor. — A form of prolonged stupor that occurs in epileptic insanity independently of epileptic convulsions.

Erythrophobia. — A form of compulsive insanity in which the patient has a morbid fear of blushing.

Excitement, Catatonic. — See catatonic excitement.

Exhaustion Psychoses. — Those forms of insanity that arise chiefly from exhausting factors, including collapse delirium, amentia, and chronic nervous exhaustion.

F

Fabrication. — A disorder of memory in which pure invention is related as real experience.

Fear (in pathology). — An abnormal state characterized by apprehensiveness.

Feeling of Well-being. — That morbid emotion in which marked pleasurable feelings exist.

Fever Delirium. — A form of infection psychosis arising in connection with and depending upon fever.

Flexibilitas Cerea. — A form of catalepsy in which passive movements of a limb are met by a waxlike resistance which permits of the limbs being moulded into various positions.

Flights of Ideas. — A disorder of the train of thought in which the objects of thought change rapidly.

Folie du Doute. — A form of compulsive insanity in which morbid fear takes the form of tormenting ideas.

G

Grumbling Mania. — A mild form of irascible mania.

H

Hallucinations. — Sense deceptions in which there are no recognizable external stimuli. (See hallucinations of hearing, etc.)

Hallucinations, Dermal. — Hallucinations involving only the tactile sense.

Hallucinations, Microscopic. — The false perceptions of minute objects crawling under the skin, particularly characteristic of cocaine psychoses.

Hallucinations of Hearing. — Hallucinations that involve only the sense of hearing.

Hallucinations of Sight. — Hallucinations that involve only the sense of sight.

Hallucinations of Smell. — Hallucinations that involve only the sense of smell.

Hallucinations of Taste. — Hallucinations that involve only the sense of taste.

Hallucinations, Stable (Kahlbaum). — Those sense deceptions produced by the excitation of the so-called cortical sensory areas which are independent of the train of thought and of a fairly uniform content, consisting of a repetition of senseless words, noises, etc.

Hallucinosis. — A mental state in which hallucinations exist or predominate.

Hebephrenia. — A form of dementia præcox characterized by a gradual development of a simple, more or less profound mental deterioration.

Hyperprosexia. — A disorder of attention in which there is complete absorption of attention in some one object.

Hypersuggestibility. — A disorder of volition in which patients tend to become the prey to every accidental influence.

Hypnogogic Hallucinations. — Those sensory perceptions which occur in normal individuals, particularly at the onset of sleep, probably due to some excitation of the cortical sensory areas.

Hypomania. — The mildest of the manic phases of manic-depressive insanity characterized chiefly by busyness.

Hysterical Insanity. — Those forms of insanity that accompany hysteria.

Hysterical Lethargy. — A form of hysterical in-

sanity, closely simulating normal sleep and usually accompanied by convulsions.

I

Idiocy. — Arrested mental development of the most severe grade.

Illusions. — Falsification of real percepts, *e.g.* the perception of a face where there is only a spot on the wall.

Imbecility. — Arrested mental development of the light grade.

Impulsions. — A form of compulsive insanity in which the compulsive fears take the form of impulses.

Impulsive Acts. — Acts which are the outcome of a sudden overwhelming impulse arising within, which the patient does not have the opportunity to control.

Inconsequential Speech. — See speech, inconsequential.

Infection Deliria. — Those forms of delirium that accompany typhoid fever, variola, malaria, acute chorea, influenza, hydrophobia, and certain septic states.

Infection Psychoses. — Those forms of insanity that arise primarily from the toxins of infectious

diseases, including fever delirium, infection deliria, and postfebrile psychoses.

Insight. — The recognition on the part of the patient that he is mentally ill.

Interference. — A disorder of volition occurring chiefly in catatonia in which the accomplishment of an intended act is interfered with by the interpolation of incongruous impulses.

Intoxication Psychoses. — Forms of insanity that develop as the result of the ingestion of toxic substances, including alcoholism, morphinism, cocainism, hasheesh, etc.

Involution Psychoses. — That group of mental disorders that occur chiefly in the period of involution, including melancholia, presenile delusional insanity, and senile dementia.

Irascible Mania. — A mixed phase of manic-depressive insanity in which typical manic symptoms are accompanied by a depressed emotional tone and not by elation.

J

Juvenile Paresis. — A form of dementia paralytica that develops between the ages of ten and twenty and is characterized chiefly by simple deterioration accompanied by numerous paralytic attacks.

K

Kleptomania. — That form of impulsive insanity in which there exists an irresistible impulse to steal.

Korssakow's Psychosis. — That form of alcoholic insanity which is characterized chiefly by a profound disturbance of the impressibility of memory and of disorientation and by fabrications of memory. This name is also sometimes applied to the form of postinfection psychosis more commonly called cerebropathia psychica toxæmica.

L

Lucid Intervals. — Periods of mental clearness occurring during the course of a mental disease.

M

Mania. — The term now properly applied only to the manic phases of manic-depressive insanity, which see.

Mania, Chronic. — See chronic mania.

Mania, Constitutional. — See constitutional mania.

Mania, Grumbling. — See grumbling mania.

Mania, Unproductive. — A mixed phase of manic-depressive insanity in which the typical

manic symptoms are accompanied by a dearth of ideas and not by a flight of ideas.

Manic-depressive Insanity. — A form of mental disorder characterized chiefly by the recurrence of manic or depressed states.

Manic-depressive Stupor. — The stupor characteristic of the depressive phases of manic-depressive insanity produced by psychomotor retardation.

Manic Excitement. — A form of motor excitement occurring in manic-depressive insanity in which, in contrast to catatonic excitement, the movements are purposeful.

Manic Stupor. — A mixed phase of manic-depressive insanity in which the typical depressive symptoms are accompanied by emotional elation and not by the usual depression.

Mannerisms. — A form of stereotyped movements in which ordinary movements are peculiarly modified; instance, carrying the arm in an unusual position.

Masochism. — A form of perverted sexual instinct in which the endurance of pain increases or is substituted for sexual excitement.

Megalomania. — The term commonly applied to the clinical picture presented by a patient suffering from the expansive form of dementia paralytica.

Melancholia. — A form of involution psychosis characterized chiefly by uniform despondency, with fear, delusions of self-accusation, of persecution, and those of a hypochondriacal nature.

Memory, Impressibility of. — That aspect of memory in which impressions have residua.

Memory, Retentiveness of. — Refers to the permanence of residua.

Menstrual Insanity. — The term sometimes applied to periodical attacks of excitement occurring in female catatonics which seem to bear some relation to the menses.

Monomania. — An obsolete name for paranoia, which see.

Mood, Change of. — That emotional condition in which there is a temporary increase of emotional irritability, and a rapid change from one mood to an opposite mood.

Moral Imbecility. — The name sometimes applied to the severest forms of criminal endowment. (See born criminals.)

Moral Insanity. — See moral imbecility.

Morbid Emotions. — Feelings of unusual intensity and persistency which develop without sufficient cause.

Morbid Liar. — That form of psychopathic personality characterized by a morbid hyper-

activity of the imagination, inaccuracy of memory, and a certain instability of the emotions and volitions.

Morbid Swindler. — See morbid liar.

Morbid Temperament. — A disorder of the emotions in which there is a constitutional tendency to certain morbid feelings.

Morphinism. — The form of insanity that arises from acute or chronic morphine intoxication.

Motor Excitement. — See pressure of activity.

Muscular Tension (in pathology). — A disorder of volition in which the patient remains in the same place or attitude for considerable periods of time, due to blocking of the will.

Mutism. — A form of negativism in which the patient refuses to speak.

Mysophobia. — A form of compulsive insanity in which there is a morbid fear of dirt or contagion.

Myxœdematous Insanity. — A form of insanity that sometimes accompanies myxœdema and is characterized by a progressive mental deterioration.

N

Negativism. — A disorder of volition in which there is an impulsive resistance to all external influences.

Neologism. — The use of new or invented terms, some of which are altogether meaningless, as " nutch," " strews," " dymantic."

Nervousness. — A congenital morbid mental state in which there is a lack of symmetry in the development of the entire psychic personality and an inability to withstand the misfortunes of life.

Neurasthenia (acquired). — One of the exhaustion psychoses characterized chiefly by increased susceptibility to fatigue, increased emotional irritability, and numerous, mostly subjective, physical symptoms.

Nocturnal Restlessness. — The restlessness shown chiefly by senile dements who wander at night.

O

Occupation Delirium. — See delirium, occupation.

Onomatomania. — A form of compulsive insanity in which there is a compulsion to ponder over the names of persons.

Organic Dementia. — A term applied in a limited sense to those psychoses that develop in connection with gross organic diseases of the central nervous system, including arteriosclerosis insanity, traumatic insanity, syphilitic insanity, etc.

P

Paralysis of the Will. — A disorder of volition in which there is a more or less complete suspension of volitional activity.

Paralysis of Thought. — That disturbance of the train of thought in which there is a more or less complete absence of all association.

Paranoia. — An irrecoverable form of mental disease of slow onset, characterized by progressively systematized delusions, for many years unaccompanied by any dementia.

Paresis. — See dementia paralytica.

Perseveration. — A disorder of the train of thought, similar to simple persistent ideas, in which the patient repeats the name of objects previously indicated, when shown a different object.

Polyneuritic Psychosis. — See cerebropathia psychica toxæmica.

Postepileptic Insanity. — That form of epileptic insanity that develops immediately following a seizure, lasting from a few hours to several days.

Postfebrile Psychoses. — See postinfection psychoses.

Postinfection Psychoses. — Those infection psychoses that develop subsequent to the subsidence of fever.

Preëpileptic Insanity. — A temporary form of epileptic insanity that develops immediately preceding the epileptic convulsion.

Presbyophrenia. — A form of senile dementia characterized chiefly by a marked disturbance of the impressibility of memory.

Presenile Delusional Insanity. — One of the involution psychoses presenting many of the characteristics of dementia præcox and in which there is a marked impairment of judgment with numerous unsystematized delusions of suspicion, and greatly increased emotional irritability.

Pressure of Activity (motor excitement). — A condition in which there is greatly increased activity, which is out of proportion to the stimulus and the importance of the motive.

Primary Traumatic Insanity. — An acute form of traumatic insanity which immediately follows the cerebral injury and is characterized chiefly by delirium.

Pseudodipsomania. — The name applied to some of the unstable personalities that occasionally suffer from periods of excessive alcoholic intoxication.

Pseudohallucinations.— Ideas of great sensory vividness.

Pseudoquerulants. — One of the morbid per-

sonalities resembling somewhat genuine querulants, but which never develop real delusions.

Psychic Epilepsy. — That form of epileptic insanity in which various morbid mental states of excitement, stupor, etc., occur independently of epileptic convulsions.

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